Expert Report for Jefferson County, Alabama 2021 Redistricting Plan

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1 Introduction and Qualifications

I have been asked by counsel for the Jefferson County, Alabama County Commission to evaluate whether the 2021 enacted commission maps are racially gerrymandered. I recognize that the ultimate answer to that question is a legal question for the court, and I offer no legal conclusions in this report. In evaluating this question from the perspective of political science, I consider a variety of factors related to race and redistricting.

I am an associate professor of political science at Brigham Young University and director of the Center for the Study of Elections and Democracy in Provo, Utah. I received my PhD in political science from Princeton University in 2014 with emphases in American politics and quantitative methods/statistical analyses. In my position as a professor of political science, I have conducted research on a variety of election- and voting-related topics in American politics and public opinion. Much of this research has been published in my discipline's top peer-reviewed journals. I have published more than 20 peer-reviewed articles.

I have worked as an expert witness in a number of redistricting cases in which I have been asked to analyze and evaluate various political and geographic-related data and maps, including in New York, Ohio, Pennsylvania, Louisiana, and North Carolina. I have also contracted by the Court as the Mapping Special Master in Michigan to draw remedial districts for the Michigan House and Senate. I have previously provided expert reports in several other cases related to voting rights, redistricting, and other election-related issues for groups representing both Republican and Democratic interests. Cases in which I have testified at trial or by deposition are listed in my CV, which is attached to the end of this report. Outside of litigation and courtrooms, I also recently contracted to work with the Virginia Office of Civil Rights as a voting rights expert consultant.

The analysis and opinions I provide below are consistent with my education, training in statistical analysis, and knowledge of the relevant academic literature. These skills are well-suited for this type of analysis in political science and quantitative analysis more generally. My conclusions stated herein are based upon my review of the information available to me at this time and sources have been cited throughout. I am being compensated at a rate of $450.00

per hour. My compensation does not depend in any way on the outcome of the case or on the opinions or testimony that I provide. I reserve the right to update and revise this report as new information becomes available.

1.1 Summary of Conclusions:

The analysis I conducted to produce this report leads me to the following conclusions:

- The 2021 enacted map seeks to retain the population of the 2013 commission districts to an extremely high degree. All districts retain more than 90% of their population and the overall shift in population as a result of the 2021 redraw is less than 5% of the population of the county.

- The plaintiffs' experts make a variety of arguments regarding precinct movements as evidence of race predominating in the drawing of the 2021 map. Their analysis fails to consider alternative explanations for precinct movement that negate race as a predominant motive for these changes.

- The plaintiffs' experts put forward a series of illustrative maps. These maps do not offer much assistance in assessing the degree to which race predominated in the 2021 enacted map because they fail to consider the same non-racial factors that the commission did when drawing the enacted map.

- A large set of computer-drawn maps show that the enacted map is similar to maps drawn without race as a consideration.

- Together, these results lead me to the overall opinion that the enacted 2021 maps were drawn in a way that race was not the predominant factor.

2 Overview of 2021 Enacted Map

The 2021 Jefferson County Commission map contains five districts that largely resemble the districts that were used in the previous decade. Across all five districts, approximately 33,000 people were moved from one district to another. This is a very small fraction (5%) of the more than 670,000 people who resided in Jefferson County at the time of the 2020 Census. It is clear by the incredibly small shift in population that the primary objective of the commission when drawing the new maps was to retain the old districts to a very high degree while also bringing the districts in line with population equality.

At the time of the 2020 Census the districts were dramatically malapportioned with the difference between the least populous district (CD-2) and the most populous district (CD-5) being nearly 25,000 people, or 18% of the ideal district population of 134,944. The 2021 districts are all within 1% of the ideal district population using population data from the 2020 US Census.[1] Bringing the population into balance while simultaneously retaining such a high degree of overlap between the old and new districts is not an easy task given that precincts are not all evenly sized and population gains and losses are not evenly distributed across the county. In total, 13 of the 183 precincts (or portions of the precinct) saw changes to their district assignment.[2]

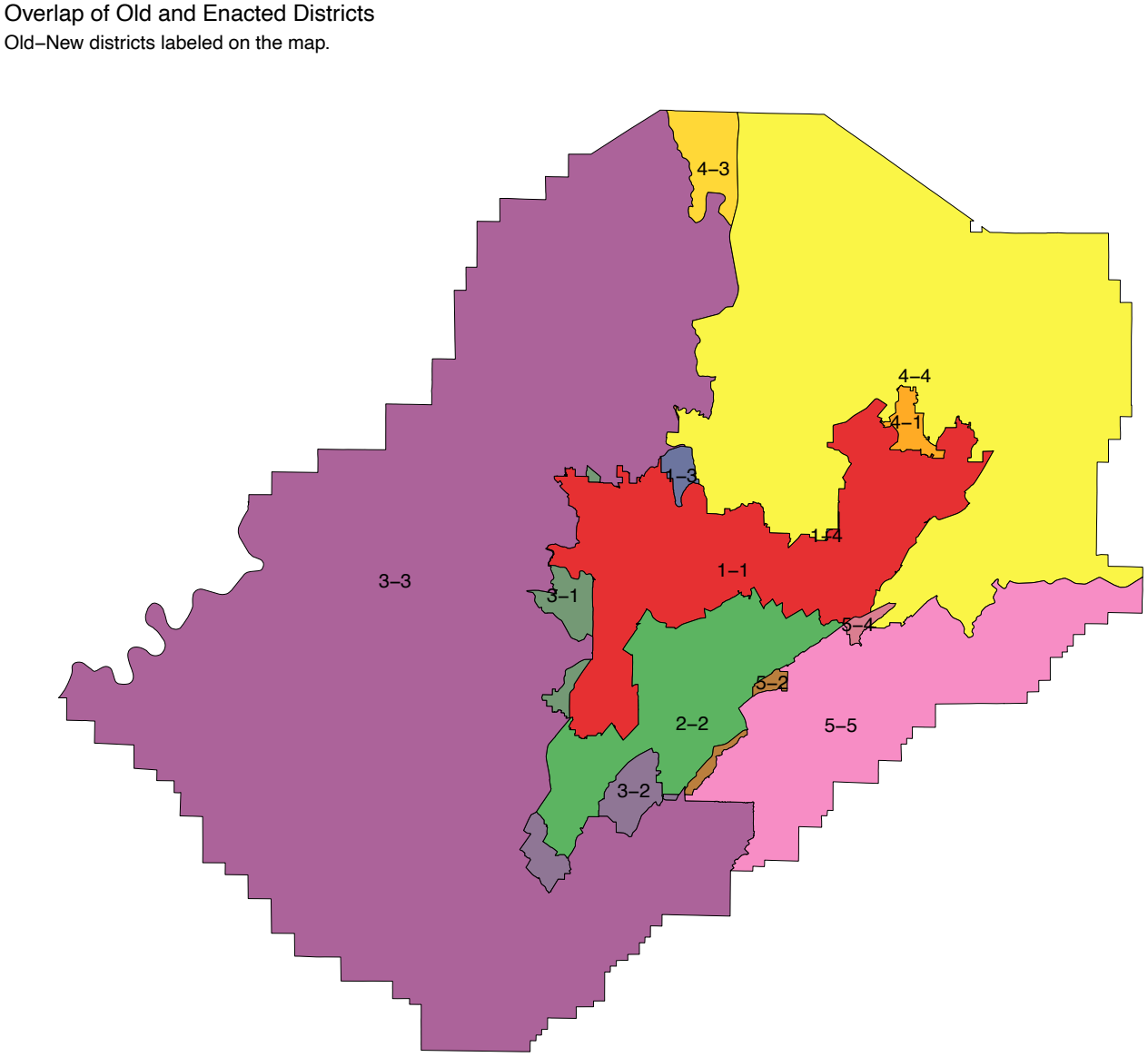
Figure 2 shows a map of the 2013 and 2021 districts superimposed on one another. The figure notes the areas that were moved between districts. The first number is the 2013 district assignment and the second number is the 2021 district assignment. For example, 4-3 would denote the area that was in District 4 in the 2013 map and is now in District 3.

Table 1 shows the proportion of the population from each of the 2013 districts that are retained in the new commissioner districts. The rows show the new 2021 districts and the columns show the 2013 districts. Reading across the rows shows the retention of the old districts by the new districts. For example, the first row of the table shows that 90% of 2021 District 1's population comes from 2013 District 1. The second row of the table shows that 90.1% of 2021

[1] See the transcript of the November 4, 2021 commissioner meeting in which Barry Stephenson stressed a 1% population deviation (pg. 14).

[2] The number of precincts could vary slightly depending on if a person counts split precincts as two separate precincts or not. A more conservative count yields around 173 precincts.

Figure 1: Jefferson County Commissioner Districts, Old and New Overlap



District 2's population comes from 2013 District 2. Districts 3 and 4 retain 99% and 95% of the old district populations, respectively, and 2021 District 5 is composed entirely of population from the old District 5.[3]

Core retention can be analyzed in two ways. Table 1 shows the percent of the new 2021 districts that are composed of 2013 district population. Alternatively, one could calculate the

[3]See the transcript of the meeting of commissioners in which Commissioner Knight articulated the commission's desire to retain population from the 2013 districts.

Table 1: Percentage of 2013 Districts Split Across 2021 Districts

	2013 District				
2021 District	1	2	3	4	5
1	0.90	0	0.026	0.074	0
2	0	0.901	0.052	0	0.047
3	0	0	0.989	0.011	0
4	0	0	0	0.964	0.036
5	0	0	0	0	1

Note: Reading across each row shows the proportion of the population in each 2021 district that came from a 2013 District. For example, 2021 District 1's population is 90% from 2013 District 1, 2.6% from 2013 District 3, and 7.4% from 2013 District 4.

Table 2: Percentage of 2021 Districts Split Across 2013 Districts

	2021 District				
2013 District	1	2	3	4	5
1	0.999	0	0.001	0	0
2	0	1	0	0	0
3	0.025	0.049	0.926	0	0
4	0.071	0	0.010	0.919	0
5	0	0.044	0	0.033	0.923

Note: Reading across each row shows the proportion of the population in each 2013 district that went into a 2021 District. For example, 4.4% of 2013 District 5's population went to 2021 CD-2, 3.3% of 2013 District 5's population went to 2021 CD-4 and 92.3% of 2013 District 5's population stayed in 2021 CD-5.

percent of the 2013 district population that was kept in the same district. Using the first way, the underpopulated districts (CD-1, and CD-2) will have lower core retention because they need to add population and the overpopulated districts (CD-3, CD-4, CD-5) will have higher retention because they shed population. Table 2 shows the results of the alternative method of calculating core retention. Using this method the underpopulated districts have higher retention scores and the overpopulated districts have lower retention scores. However, across both methods, all districts have very high retention scores (above 90%).

It is common for lawmakers to seek to retain large portions of their old districts, and political science research suggests that doing so can have positive benefits for voters and representation in general. Research in political science shows that core retention is an important

factor for voters and redistricting.[4] For example, Hayes and McKee (2009) find that voters who "inherit" new incumbents as a result of redistricting are "half as likely to know their incumbent's name as citizens who remain in a familiar incumbent's district and, consequently, significantly more likely to roll off, or abstain from voting in the House election after having cast a presidential vote" (pg. 1006).[5] Other research shows that moving voters into new districts with unfamiliar incumbents can harm the connection voters have to their representatives.[6] Desposato and Petrocik (2003) note that voters who are moved into new districts no longer have the connection with their representatives who can provide important constituent services such as assisting with navigating government bureaucracies.[7]

Furthermore, various state constitutions and some courts have recognized the importance of a "least change" approach to redistricting.[8] For example, courts in Minnesota, New Hampshire, Missouri, Wisconsin and Pennsylvania selected potential maps, in part, because of their high retention of the population in the former districts.[9]

Another common redistricting principle is to avoid splitting cities and municipalities across more districts than is necessary. In the case of Jefferson County, this is a particularly difficult task because of the way in which municipalities in the county wind and meander, contain holes and appendages, and are not geographically compact, likely due to a history of frequent annexations

[4]Barabas, Jason, and Jennifer Jerit. "Redistricting principles and racial representation." State Politics & Policy Quarterly 4, no. 4 (2004): 415-435.
Sabouni, Hisam, and Cameron Shelton. "State legislative redistricting: the effectiveness of traditional districting principles in the 2010 wave." Election Law Journal: Rules, Politics, and Policy 20, no. 2 (2021): 198-214. //

[5]Hayes, Danny, and Seth C. McKee. "The participatory effects of redistricting." American Journal of Political Science 53, no. 4 (2009): 1006-1023.

[6]Fenno, Richard F. "US House members in their constituencies: An exploration." American Political Science Review 71, no. 3 (1977): 883-917. // Cain, Bruce, John Ferejohn, and Morris Fiorina. The personal vote: Constituency service and electoral independence. Harvard University Press, 1987.

[7]Desposato, Scott W., and John R. Petrocik. "The variable incumbency advantage: New voters, redistricting, and the personal vote." American Journal of Political Science 47, no. 1 (2003): 18-32.

[8]Becker and Gold (2022) note that three states have district-core retention as a criteria in their state constitution or statutes. Several others list the criteria in their redistricting guidelines. Becker, Amariah, and Dara Gold. "The gameability of redistricting criteria." Journal of Computational Social Science 5, no. 2 (2022): 1735-1777.

[9]See, Special Redistricting Panel, 2012. State of Minnesota, A11-152, Office of Appellate Courts, "https://www.mncourts.gov/mncourtsgov/media/CIOMediaLibrary/Redistricting2011Final/Final_Order_Adopting_A_Congressional_Redistricting_Plan.pdf", Below v. Gardner, 2002. 148 N.H. 1 (Supreme Court of New Hampshire, No. 2002-0243), Norelli v. Secretary of State, 2022. No. 2022-0184, Supreme Court of New Hampshire, Stenger v. Kellett, 2012. United States District Court Eastern District of Missouri Eastern Division, No. 4:11CV2230 TIA, Carter v. Chapman, Commonwealth Court of Pennsylvania - No. 464 MD 2021 [together with No. 465 MD 2021] [Formerly Carter v. Degraffenreid II], Clarke v. Evers, The Supreme Court of Wisconsin - 2023AP001399

Table 3: Percentage of Each of the Ten Largest Municipalities Split Across 2021 Districts

	2021 District				
	1	2	3	4	5
Birmingham	0.426	0.508	0.001	0.043	0.023
Hoover	0	0.007	0.536	0	0.457
Vestavia Hills	0	0	0	0	1
Homewood	0	0.307	0	0	0.693
Bessemer	0	0.665	0.335	0	0
Mountain Brook	0	0.002	0	0.016	0.982
Trussville	0	0	0	1	0
Center Point	0.586	0	0	0.414	0
Hueytown	0.001	0	0.999	0	0
Gardendale	0	0	0.006	0.994	0

over time.[10] This is further compounded by the fact that municipal boundaries in the county do not always follow precinct boundaries, making overlap even more difficult.[11] Despite this, the enacted map does a reasonably good job of avoiding splitting cities more than necessary. Table 3 shows the fraction the population contained in each commissioner district for each of the 10 largest municipalities in the county.

Birmingham's population is too large to be contained in one district and is thus required to be split across at least two districts. The enacted map divides the county's largest city mostly across Districts 1 and 2 with other farther flung appendages to the city contained in Districts 4 and 5. A tiny sliver of the city is in District 3.

The application of the redistricting principles of avoiding splitting or dividing the previous districts and municipalities in the county has a large impact on the racial composition of the enacted districts insofar as voters of different racial groups are not evenly distributed across the county. For example, Birmingham's population is nearly 70% Black, and therefore, any map that seeks to keep Birmingham within a single district (or two districts due to the size of the city) will likewise contain a substantial Black population. Likewise, the 2013 Districts 1 and 2 were both substantially Black at the time of their creation in 2013 and were majority Black at the time of the 2020 census. Therefore, any map that seeks to build the new districts by making

[10]See the Stephenson Deposition, pg. 88-92 for a discussion of municipal annexations by Jefferson County municipalities.

[11]See Stephenson Deposition, pg. 91.

as few changes as possible to the old districts will inherit much of that racial composition.

In the sections that follow I discuss the specific precincts that were chosen to move between districts. I then consider the "illustrative" maps put forward by the plaintiffs' experts and show that their maps do not help illustrate whether or not the enacted map constitutes a racial gerrymander. The illustrative maps simply show that it is possible to draw a map that contains districts with dramatically different racial profiles from the enacted map by abandoning the primary consideration used to create the enacted map: district core retention. The introduction of a few illustrative maps does not provide evidence that race predominated in the drawing of the enacted map. It only shows that core retention did not predominate in the drawing of the illustrative maps.

3 Precinct-by-Precinct Analysis

3.1 District 1

District 1 was underpopulated at the time of the 2020 Census and contained 122,675 people, 12,269 fewer than the target district population in 2020.[12] Therefore, the new district would need to have a net increase in population. This was accomplished in two ways. First, population from neighboring precincts in Districts 3 and 4, both of which were overpopulated in 2020, were added to District 1. Then a small population (89 people) were added from District 1 into District 3.

At the time of the 2010 Census, District 1 had a BVAP of 73.2%. By the end of the decade, due to shifts in population, at the time of the 2020 Census the district had a BVAP of 76.4%, but was underpopulated by several thousand people. Following the redraw in 2021 the district had a BVAP of 76.3% using the 2020 Census data.[13]

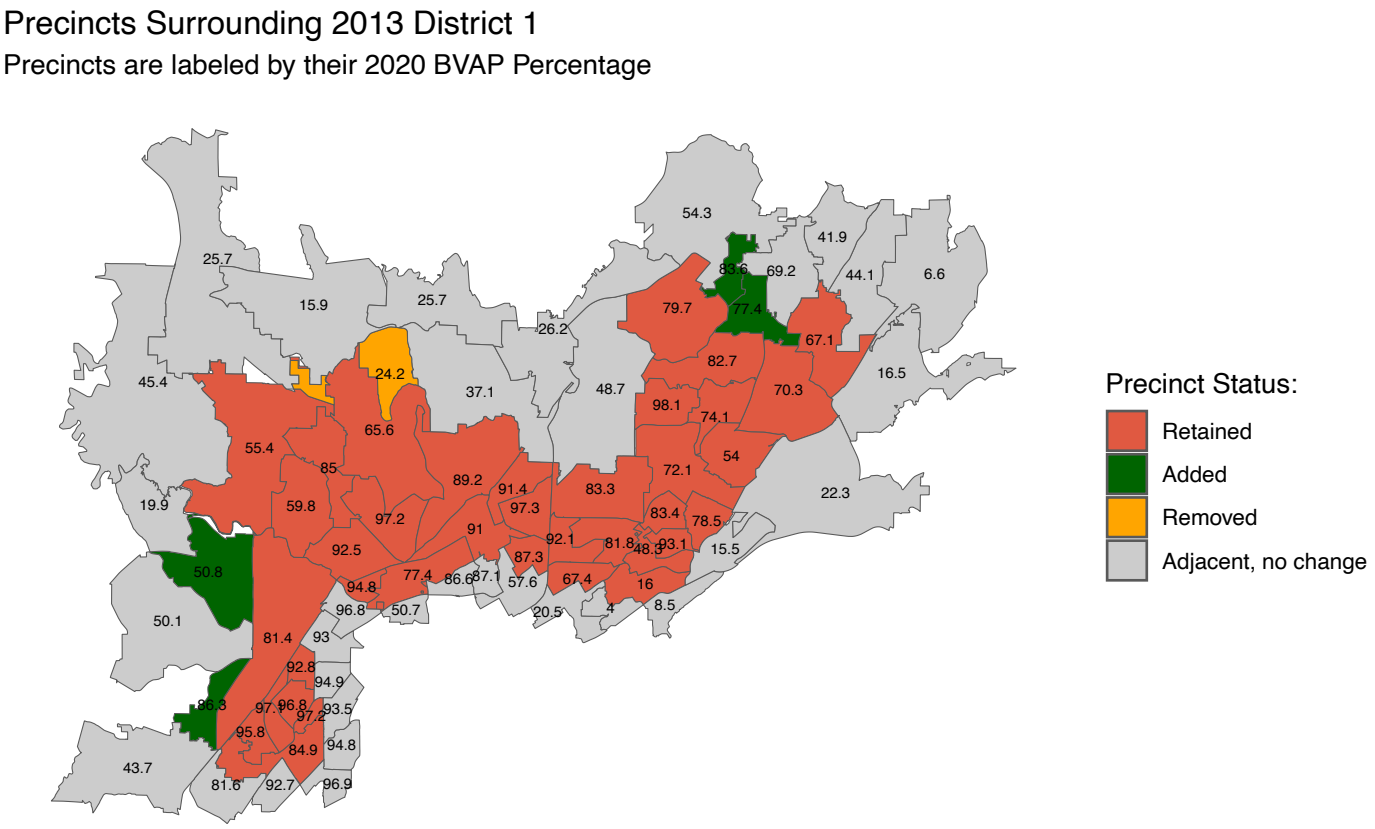
Figure 2 shows a map of the precincts in old District 1 and those that bordered it. The

[12]There are small differences in the population of the district at the time of the 2020 census. The Cooper and Fairfax reports list District 1 as having a population of 122,600. The County's report (exhibit JCC0000002-JCC0000018) lists the population as 122,689.

[13]These statistics and the equivalent statistics for other districts were derived by importing the maps into Dave's Redistricting at https://davesredistricting.org

precincts are color coded by whether they were retained, removed, or added to District 1 during the 2021 redraw. The BVAP of each precinct is also noted in the figure. As seen in the figure, portions of one precinct were removed and portions of four precincts were added to CD-1.

Figure 2: 2013 CD-1 Precincts and Border Precincts

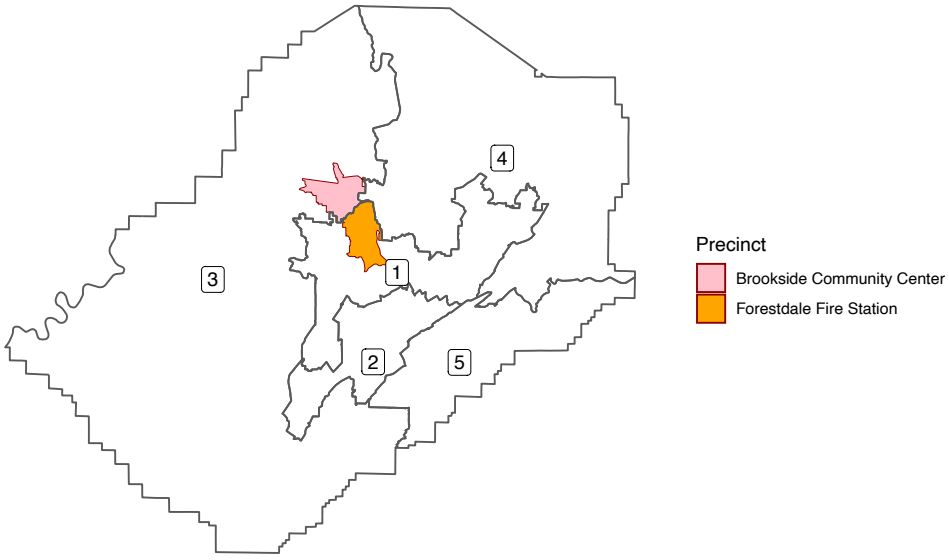


Why would District 1 shed population to District 3 if it was underpopulated to begin with? One likely explanation is that the Board of Registrars received complaints from voters who had to drive eight miles to their voting precinct. The change moved fewer than 100 people and allowed them to vote at a location very close to where they live.[14] Figure 3 shows this change.

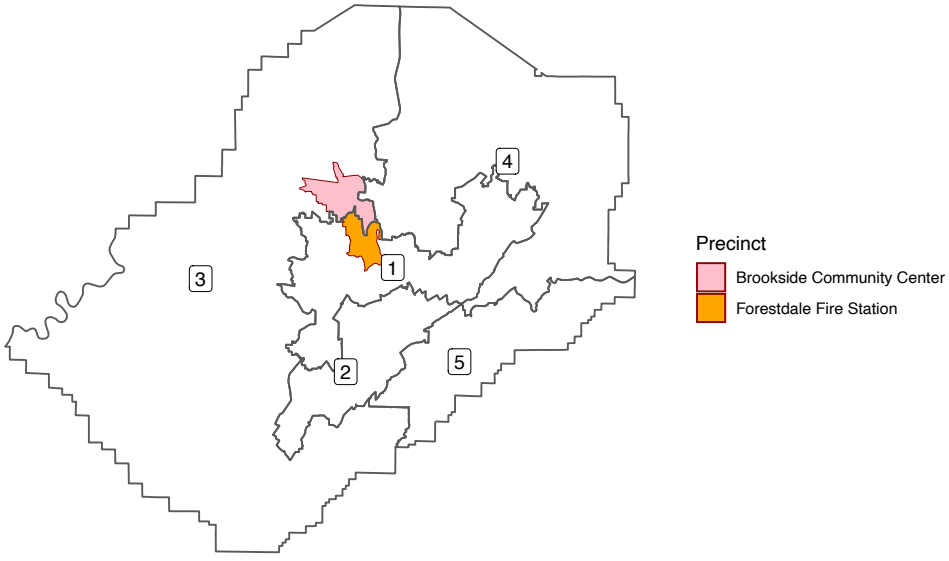
[14]Stephenson Deposition, page 43. A very small sliver of land was also moved from District 1 into District 4 (6 people are affected). This appears to be the result of moving a district boundary to align with a major road, East Lake Blvd north of the airport.

Figure 3: Brookside Community Center and Forestdale Fire Station Precincts

(a) 2013 Map



(b) 2021 Map



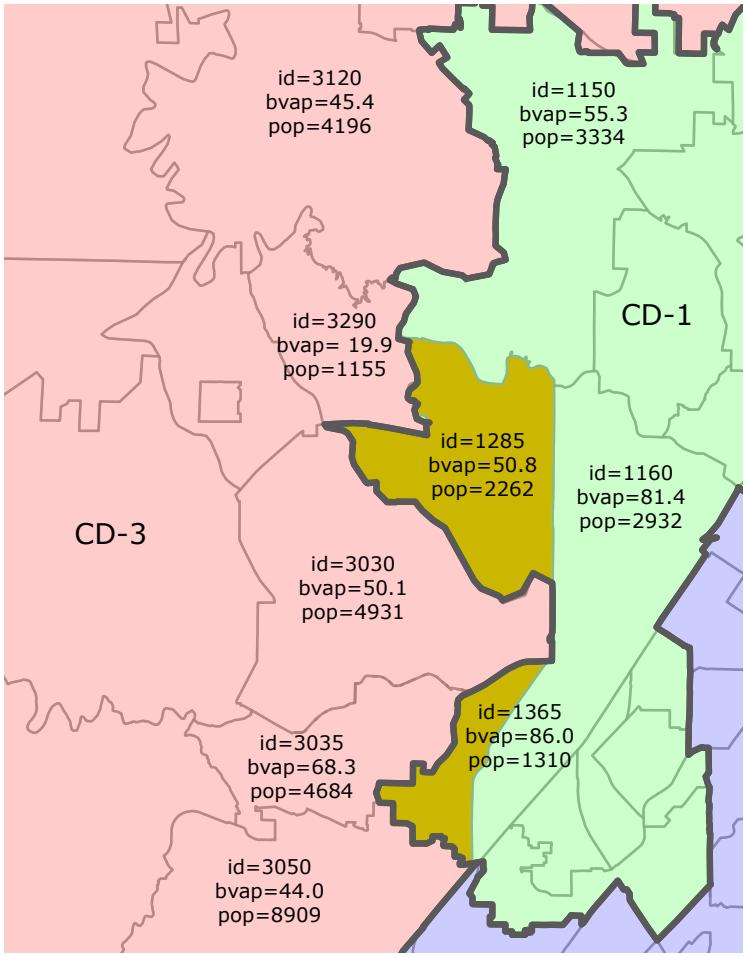
There are portions of two precincts from which District 1 draws population from District 3. Both are on the western border of District 1 and the eastern border of District 3. Together these two precincts add 3,572 people to District 1 and are 64.4% Black (64.0% BVAP). Figure 4 shows a map of these two precincts (1285 and 1365), highlighted in orange, and the boundaries of the 2021 map. The precinct number and BVAP of each precinct is noted on the map. It is immediately apparent that these two precincts are not unusual in their BVAP and any choice of precincts to add from CD-3 to CD-1 would have resulted in similar Black populations moving between districts.

Dr. Williamson suggests that this choice is evidence of a racial gerrymander. His evidence reveals exactly the opposite. Dr. Williamson notes that a portion of what is now precinct 1365 was left in CD-3 and joined with precinct 3035. He suggests that this shows "a predominantly Black community being drawn out of a predominantly Black district and placed into a predominantly white district" (pg. 11, Williamson Report). This is exactly the opposite of what happened. These voters were never in District 1 and were a part of District 3 in the 2013 map. Furthermore, those people who reside in precinct 1365 and were moved into CD-1 are largely in Birmingham (90.6% of the population moved into CD-1 from precinct 1365), while those in precinct 1365 who remained in CD-3 are not Birmingham residents. Thus, municipality boundary considerations explain this choice better than race.

Furthermore, precinct 3035, which was combined with the portions of precinct 1365 that remained in CD-3, was also substantially Black (BVAP of 64.0%), as is the precinct immediately north (precinct 3030) that has always been a part of CD-3. In other words, nearly all of the precincts along the CD-3 and CD-1 border contain substantially Black populations and the choice to move these two precincts from CD-3 to CD-1 is not explained by racial considerations as well as it is by other factors like population equality and municipal boundaries in a region of the county that happens to also be substantially Black.

I turn now to the northern boundary of 2021 District 1. There are portions of two precincts from which District 1 draws population from District 4. Both are on the northern border of District 1 and the southern border of District 4. Together these two precincts add

Figure 4: CD-3 and CD-1 Border Precincts

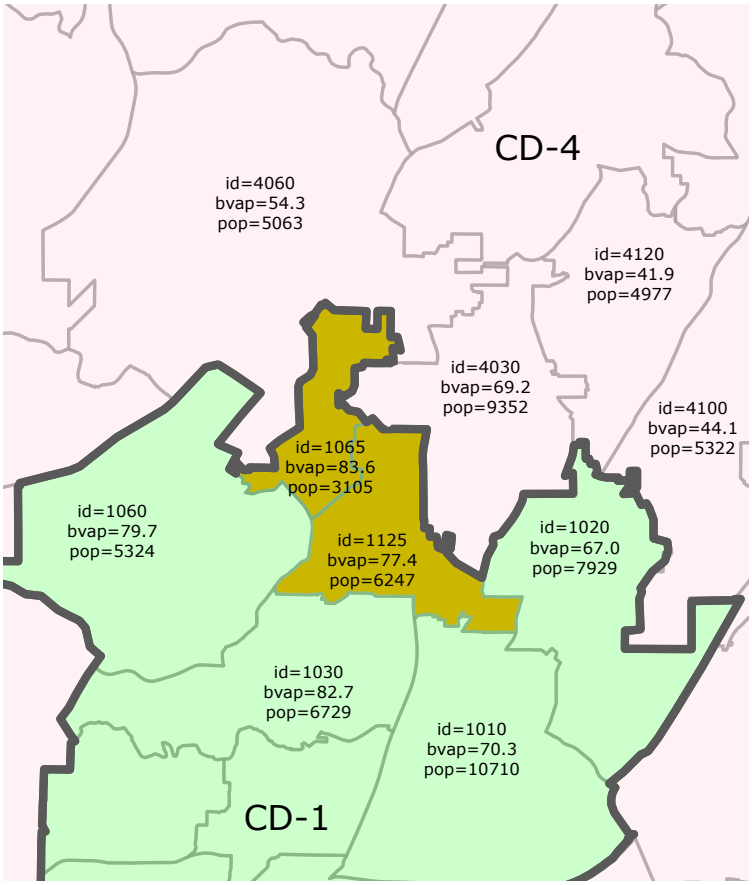


Note: Precinct boundaries are shown in grey. The 2021 district border is shown with a bolded black line. The two precincts that were moved from CD-3 to CD-1 are noted in orange. The BVAP of each precinct is noted on the map with the precinct identifier noted above it.

9,372 people to District 1 and are 82.5% Black (79.5% BVAP). Figure 5 shows a map of these two precincts (1065 and 1125), highlighted in orange, and the boundaries of the 2021 map. The precinct number, BVAP, and population of each precinct is noted on the map. While these two precincts have a high BVAP, the neighboring precincts also contain substantial Black populations. Furthermore, precinct 1065 contains only 3,105 people. Any selection of nearby alternative precincts to include in CD-1 would be too large and would need to be split to only include the population that was geographically closer to CD-1. However, the population in these precincts that lives closer to the CD-1 boundary also contains higher BVAP than those that live

further north, and thus any other portion of the neighboring precincts would likely be just as substantially Black as precinct 1065.

Figure 5: CD-4 and CD-1 Border Precincts



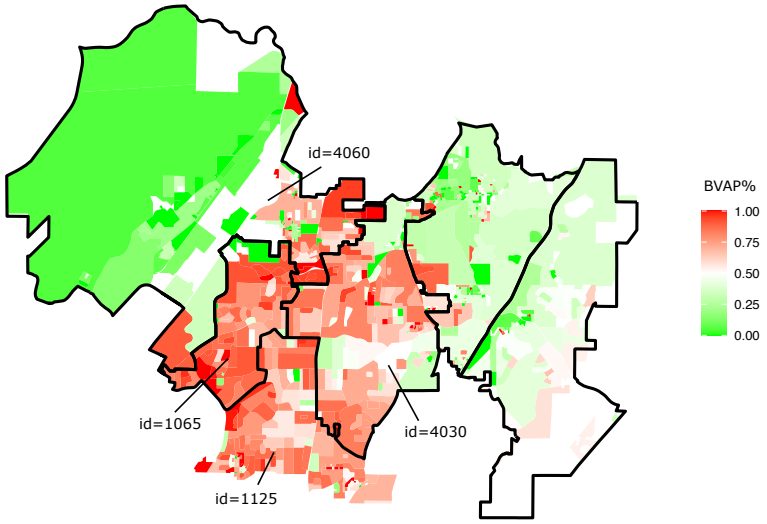
Note: Precinct boundaries are shown in grey. The 2021 district border is shown with a bolded black line. The two precincts that were moved from CD-4 to CD-1 are noted in orange. The BVAP of each precinct is noted on the map.

Dr. Williamson and Mr. Fairfax suggest that this choice to split precinct 4060 to create precinct 1065 and add it to CD-1 is evidence of a racial gerrymander. However, this argument does not hold when looking closely at the particular boundaries of the newly created precinct 1065. Figure 6 shows the boundaries of precinct 1065 and other neighboring precincts that could have alternatively been added from CD-4 into CD-1 to equalize population.

There are three points that all work against the conclusion that this is a racial gerryman-

der. First, Figure 6 shows that the boundaries of newly-created precinct 1065 do not follow racial lines. There are adjacent census blocks that are supermajority BVAP that were not included in CD-1 and blocks that contain fewer Black individuals that were included in CD-1. Thus, the particular boundaries of this precinct division do not suggest race as a primary motivation. Second, the other precinct in this area that could have been added to CD-1 instead of precinct 1065, precinct 4030, is also majority Black, particularly in the area adjacent to CD-1. Thus, any choice of precincts in this area would move substantially Black populations from CD-4 to CD-1, meaning that the movement of precinct 1065 alone cannot be evidence that race predominated.

Figure 6: CD-4 and CD-1 Border Precincts and Census Block BVAP



Note: Precinct boundaries are shown in black. The 2021 district border is shown with a bolded black line. The two precincts that were moved from CD-4 to CD-1 are noted in orange. The BVAP of each precinct is noted on the map.

The choice to create precinct 1065 and add it to CD-1 also accomplishes two objectives that are consistent with traditional redistricting criteria. First, the shift moves population from Birmingham into CD-1 (2,168 people), further reducing the population of Birmingham that is outside CD-1 and increasing the retention of Birmingham. Reducing municipal divisions is a traditional redistricting criteria. Any alternative choice of precincts to add to CD-1 in this area would not have accomplished this goal and would have left Birmingham further divided across more districts.

Furthermore, this precinct substantially overlaps the boundaries of the Birmingham City Council District 1. The current county commissioner in District 1, Lashunda Scales, previously held this city council district.[15] Political science research has long studied politicians' ability to develop relationships with voters, in what scholars call "home style" or "personal vote."[16] It would make sense that a lawmaker who had previously represented a group of constituents in one office would want to continue to represent those same citizens in a different elected position.[17] Figure 7 shows the overlap between precinct 1065, which was added to CD-1 and the Birmingham City Council District 1 boundaries. 2,168 people in the precinct (69.8%) reside in Birmingham and are in City Council District 1.

Mr. Fairfax also offers the opinion that the reason why District 1 was not expanded north across the Pinson Valley Parkway seems to be that it would add census blocks that are below 50% Black (See Fairfax Report, pg. 37). However, this overlooks the obvious reason that the map drawers may have not wanted the district to cross the highway because 1.) this would extend the district beyond the Birmingham municipal borders, and 2.) at this point the district had an acceptable number of people and moving further northward was unnecessary and would have potentially overpopulated the district.

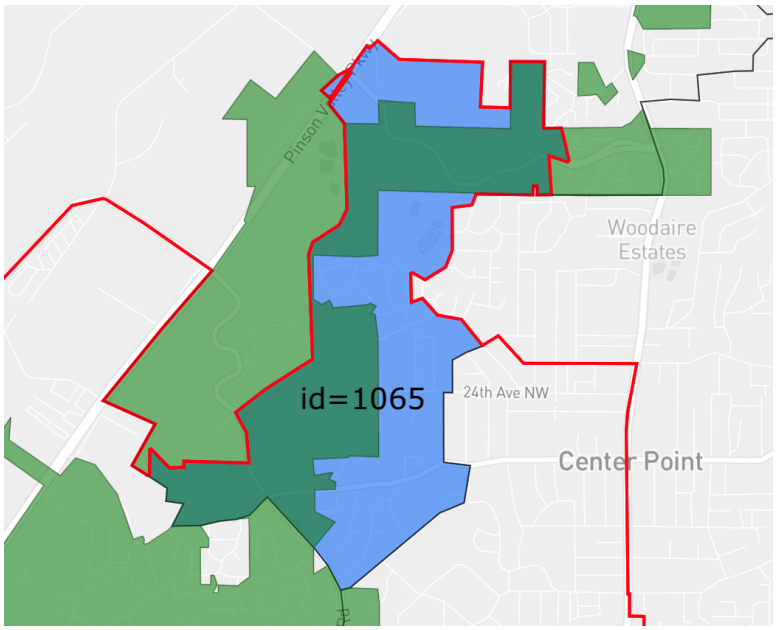
There is also an important inconsistency in Dr. Williamson's report with regards to all of the precincts that are moved into District 1 in the 2021 map. When discussing the precincts that were moved from District 4 into District 1, Dr. Williamson argues that they constitute a racial gerrymander because areas moved from CD-4 into CD-1 were substantially Black (precinct 1065 in particular). However, on the very next page he accuses CD-1 of being a racial gerrymander because it does *not* include precincts in CD-3 that are substantially Black but were not moved

[15] https://ballotpedia.org/Lashunda_Scales,
https://www.jccal.org/Default.asp?ID=504&pg=District+1+%2D+Lashunda+Scales

[16] Fenno, Richard F. "US House members in their constituencies: An exploration." American Political Science Review 71, no. 3 (1977): 883-917.
Cain, Bruce, John Ferejohn, and Morris Fiorina. The personal vote: Constituency service and electoral independence. Harvard University Press, 1987.

[17] For example, scholars have found that when there is a higher level of overlap between legislative districts and congressional districts, legislators are more likely to run for Congress because they have developed a personal style/representative relationship with more of their potential voters. Carson, Jamie L., Michael H. Crespin, Carrie P. Eaves, and Emily Wanless. "Constituency congruency and candidate competition in US house elections." Legislative Studies Quarterly 36, no. 3 (2011): 461-482.

Figure 7: Overlap between Precinct 1065 (blue) and Birmingham City (green)



Note: Adding Precinct 1065 to CD-1 increases Birmingham's population in District 1 and overlaps with City Council District 1, which was represented by the current County Commissioner for the district, Lashunda Scales.

into CD-1. This sets up an impossible situation for the county in which any action they take (adding substantially Black precincts to CD-1 or not adding substantially Black precincts to CD-1) appears, by Dr. Williamson's standards, to confirm a racial gerrymander.

Dr. Williamson then conducts a t-test to determine if the Black share of the precincts added to District 1 are statistically different than the overall Black share of the other precincts already included in District 1. This is the incorrect approach for three reasons.

First, Dr. Williamson fails to consider the implications of the results that he finds using his t-test in District 1. Dr. Williamson states, "For precincts that were moved into CD 1, the average Black CVAP was 65.53 percent. For the precincts that remained in CD1, the average Black CVAP was 79.51" (Williamson Report, pg. 11). This result suggests the opposite of a racial gerrymander of CD-1. If CD-1 is, as plaintiffs allege, a racially packed district, then one would "unpack" the district by adding precincts with lower BVAP. This is exactly what Dr. Williamson's test shows. His analysis suggests that the added precincts were, on average, nearly

14 percentage points less Black.[18]

Second, in determining if the precincts added to CD-1 were chosen because of race, the more appropriate test would be to compare the precincts that were added to *other precincts not already in CD-1 that could have been chosen instead*. Dr. Williamson does not do this. Instead he compares the added precincts to the existing precincts in CD-1. This is not informative about the motivation for why particular precincts were added to CD-1 and why others were not. It only tells us if these precincts are different than the existing precincts in CD-1.

The third error in Dr. Williamson's approach is to not consider alternative explanations for why precincts are added to a district. If plaintiffs' experts are to identify race as a predominant motive for the district boundaries, then they must evaluate if other explanations fail to explain the districts as well as race. The analysis below addresses both of the issues identified above by conducting a statistical analysis that includes all precincts that could be added to CD-1 and considers if race is a better explanation than other factors for why certain precincts are added and others are not. To do so I assemble all precincts in the county except for those already in CD-1. These constitute the universe of possible precincts that could be added. I then conduct a regression analysis in which being added to CD-1 is regressed on the precincts' racial composition (BVAP), population, and a variable indicating if the precinct is adjacent to the old CD-1 boundary. In this way, we can see if race is a statistically significant predictor of inclusion in CD-1 over and above two other obvious variables - population and geographic proximity.

Table 4 shows that when specified in this way, race is not a statistically significant predictor of which precincts are added to CD-1. The only significant predictor is geographic proximity, which makes sense if the objective of the map drawers was a least change approach that added precincts that minimally changed the shape and orientation of the existing districts.

[18]While the result is not statistically significant, he states, "Though the substantive effect is considerable (nearly 14 percentage points), there is not a statistically significant relationship between the average Black percentage in precincts that changed in the most recent round of redistricting and those that were untouched. As previously discussed, this is still substantively meaningful" (Williamson Report, pg. 11).

Table 4: Precinct Movement into CD-1

	Dependent Variable:
	Precinct Moved Into CD-1
Total Population (in 1,000s)	−0.002
	(0.006)
Black VAP%	0.001
	(0.0004)
Precinct Adjacent to Old CD-1	0.098***
	(0.031)
Constant	−0.012
	(0.033)
Observations	147
Adjusted R^2	0.077
Note:	*p<0.1; **p<0.05; ***p<0.01

3.2 District 2

District 2 was underpopulated at the time of the 2020 Census and contained 121,372 people, 13,572 fewer than the target district population in 2020.[19] Therefore, the new district would need to have a net increase in population. This was accomplished by adding population from neighboring precincts in Districts 3 and 5, both of which were overpopulated in 2020. No population was moved out of District 2.

At the time of the 2010 Census, District 2 had a BVAP of 71.3%. By the end of the decade, due to shifts in population, at the time of the 2020 Census the district had a BVAP of 66.7%, but was underpopulated by several thousand people. Following the redraw in 2021 the district had a BVAP of 64.1% using the 2020 Census data.

Figure 8 shows a map of the precincts in old District 2 and those that bordered it. The precincts are color coded by whether they were retained, added, or removed to District 2 during the 2021 redraw. The BVAP of each precinct is also noted in the figure. As seen in the figure, portions of six precincts were added CD-2.

[19]There are small differences in the population of the district at the time of the 2020 census. The Cooper report lists old District 2 having a population of 121,148 in 2020 and the Fairfax reports list District 2 as having a population of 121,159. The County's report (exhibit JCC0000002-JCC0000018) lists the population as 121,372.

Figure 8: 2013 CD-2 Precincts and Border Precincts

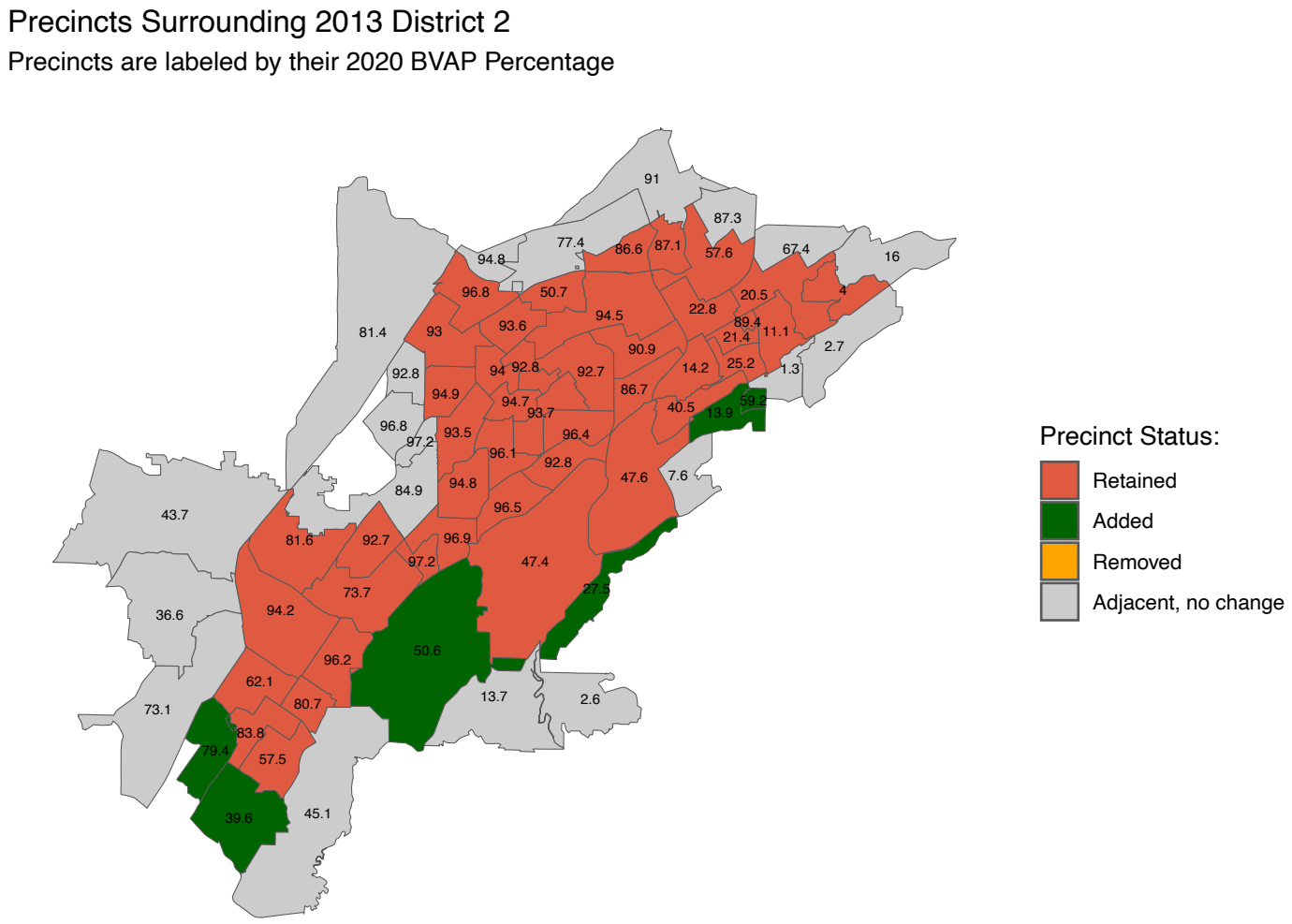
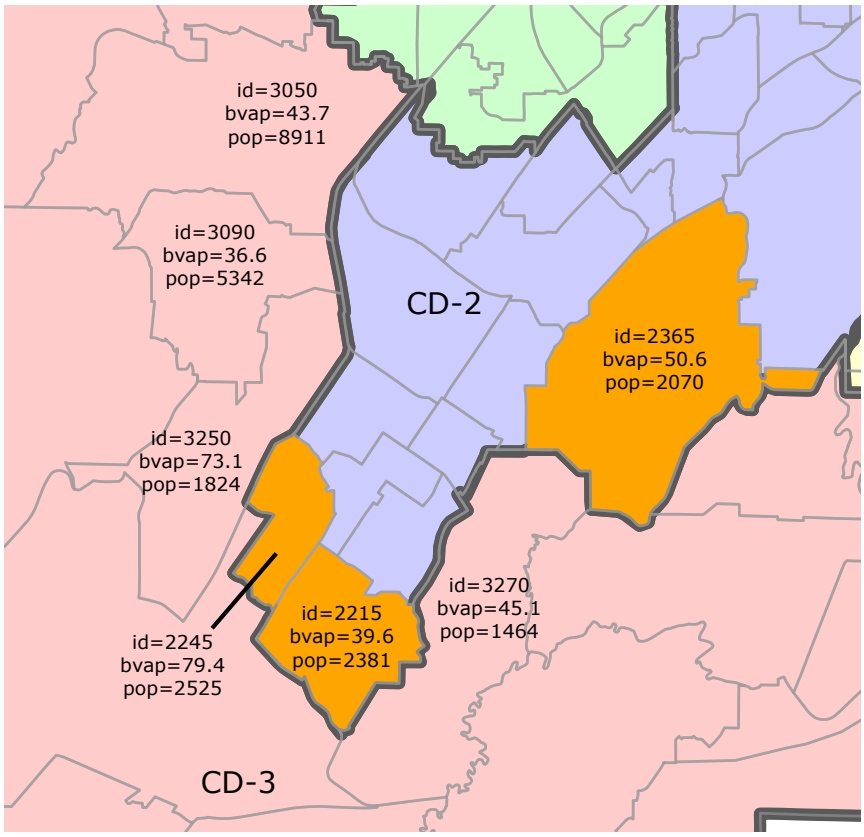


Figure 9 shows the precincts that were moved into District 2 from District 3, their BVAP, and total population. The figure also shows the same information for other precincts along the border between the two districts that were not added to CD-3. The plaintiffs' experts assert that the inclusion of these precincts is indicative of a racial gerrymander. This is incorrect for two reasons. First, the neighboring precincts in this area that were not added to CD-2 are not much different demographically from those that were included. Precinct 2245 is 79.4% BVAP. However, the precinct directly north, precinct 3250, is 73.1% BVAP. Likewise, precinct 2365, which was

added to CD-2, is 50.6% BVAP. However, the precinct directly southwest of it, precinct 3270, is 45.1% BVAP. Thus, these precincts do not have an unusually high BVAP in this region of the county. Furthermore, the plaintiffs fail to note that precinct 2215 was also moved from CD-3 to CD-2 and it has a low BVAP of only 39.6%. If the addition of precincts in this region were done to accomplish a racial gerrymander and pack Black voters into CD-2, it would not make much sense to add majority BVAP precincts only to undo that impact by adding an adjacent low-BVAP precinct.

Figure 9: CD-3 and CD-2 Border Precincts



Note: Precinct boundaries are shown in grey. The 2021 district border is shown with a bolded black line. The two precincts that were moved from CD-3 to CD-2 are noted in orange. The BVAP of each precinct is noted on the map with the precinct identifier noted above it.

Mr. Fairfax and Dr. Williamson also take issue with the two precincts that were split to move portions of the original precincts into District 2. The first split precinct is precinct 3060 (Bessemer Civic Center). The left panel of Figure 10 shows the original precinct and how it is

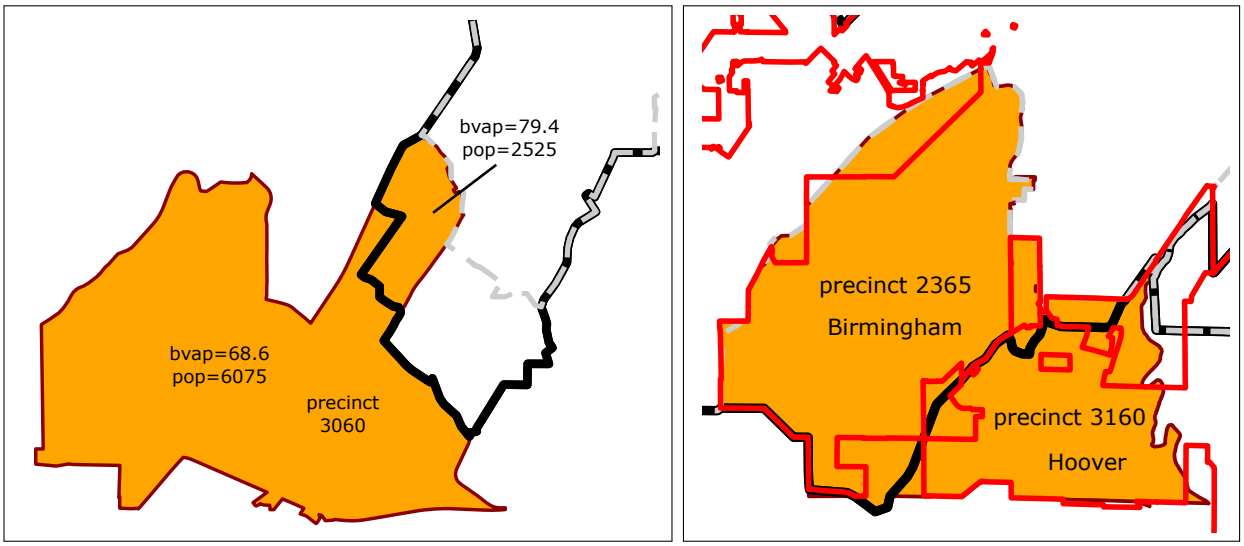
divided into CD-2 and CD-3 in the new map. As seen in the figure, the northern portion of this precinct was moved into CD-2 and the southern portion of the precinct remains in CD-3. Mr. Fairfax states that "Splitting Bessemer Civic Center increases the Black population contained within District 2 and decreases the Black population contained within District 3" (Fairfax Report, pg. 29). Dr. Williamson more or less makes a similar claim.

There are several problems with this critique. It is true that the portion of the precinct that was moved into CD-2 increases the BVAP of CD-2 and decreases the BVAP of CD-3. However, the portion that was not included in CD-2 also has a very high BVAP (68.6%). The undivided precinct had a BVAP of 71.8%. This cuts against Mr. Fairfax's suggestion that the split of this precinct was done to increase the BVAP of CD-2 since the inclusion of the *entire* precinct would also have had the same effect.[20] Furthermore, Dr. Williamson suggests that splitting the precinct is evidence of packing Black voters into CD-2 and cracking Black voters by allowing the remainder of the precinct to stay in CD-3. However, this again sets up an unwinnable scenario for the county. Suppose they had left the entirety of the precinct in CD-3. By Dr. Williamson's logic, this would also constitute racial cracking by leaving a substantially Black precinct in majority White CD-3. Suppose instead that the entire precinct had been included in CD-2. By Dr. Williamson's logic, this would constitute racial packing by moving a substantially black precinct into an already substantially Black CD-2. So no matter how precinct 3060 is treated (remain in CD-3, moved into CD-2, split between the two districts), by the plaintiffs' standards, the county is guilty of racial gerrymandering. Thus, the shift in BVAP between the two districts alone is not evidence that race predominated in the decision one way or another.

The other precinct that was divided in this area was Precinct 3160 (Church at Ross Bridge), with the northwestern portion being added to CD-2 (and being renumbered precinct 2365) and the southeast section remaining in CD-3. Plaintiffs' experts assert that this split is evidence of racial gerrymandering because the portion of the precinct that was added CD-2 has a higher BVAP than the portion that remained in CD-3. This is incorrect for two reasons. First,

[20]What is more likely is that including the entire precinct would have added too much population, more than 8,500 people.

Figure 10: Precincts Divided and Moved into CD-2 from CD-3



Note: The 2021 district border is shown with a bolded black line. The pre-2020 district boundary is shown in grey dashed line. In the righthand figure, municipal boundaries are shown in red.

the portion that was added to CD-2, while having a higher BVAP, is only 50.6% Black. Thus, adding it to CD-2 actually had the effect of lowering the BVAP of that district, not increasing it. Second, the division of this precinct is better explained by an attempt to align districts with municipal boundaries. The right panel of Figure 10 shows that the division of the precinct (shown by the solid black line, indicating the boundary between CD-3 and CD-2) aligns very closely with the municipal boundary between Birmingham and Hoover (shown by the solid red line).[21]

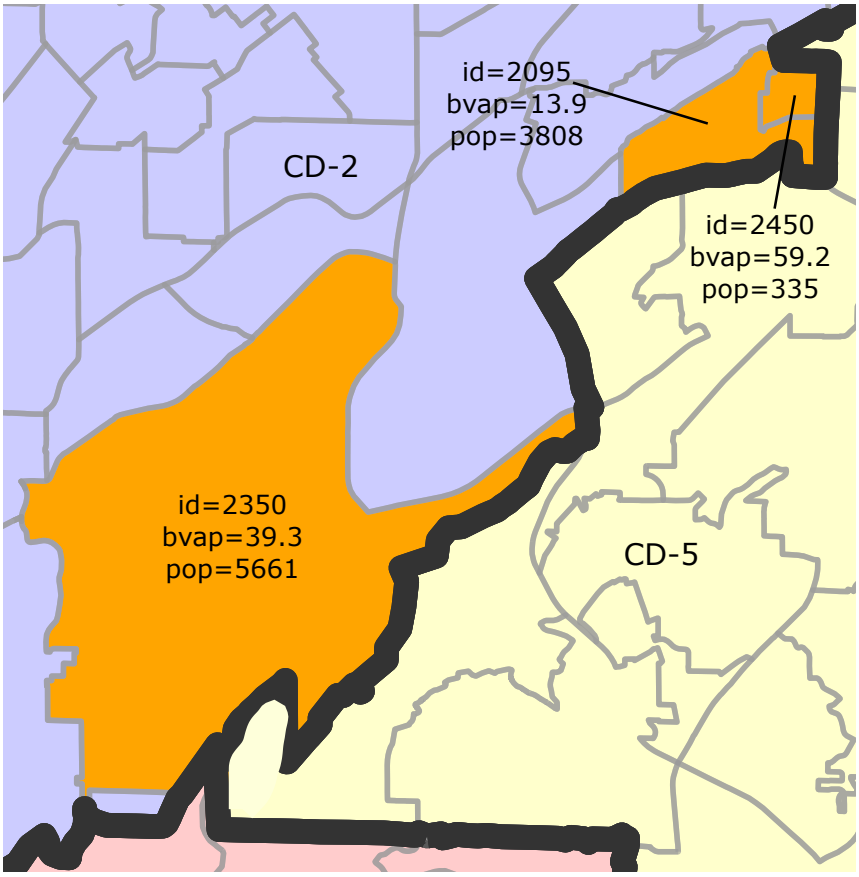
District 2 also received population from three precincts that were previously located in District 5. A total of 6,366 people were moved from District 5 to District 2. This population was majority white and had a BVAP of 21.4% collectively. Figure 11 shows the precincts that were moved from District 5 to District 2, the BVAP and total population of each precinct.

Dr. Williamson mistakenly asserts that the entirety of precinct 2350 was included in District 5.[22] This is incorrect as only a small portion of this precinct was included in CD-5 in

[21]Mr. Fairfax also notes that this precinct division aligns with municipal lines (Fairfax Report, pg. 29). We would not expect a perfect alignment since municipal boundaries in Jefferson County do not follow precinct boundaries or even major roads or geographical features in many cases.

[22]See Williamson Report, page 6. "Under the old plan, this precinct was in the majority white CD 5 but has since been moved to the majority Black CD 2, again depicting the packing of Black citizens."

Figure 11: Precincts moved from CD-5 to CD-2



Note: Precinct boundaries are shown in grey. The 2021 district border is shown with a bolded black line. The three precincts that were moved from CD-5 to CD-2 are noted in orange. The BVAP of each precinct is noted on the map with the precinct identifier noted above it.

the 2013 map. This is an important mistake to note because Dr. Williamson then concludes, based on this incorrect information, that the movement of this precinct into CD-2 is evidence of racial packing. First, this is simply wrong since the majority of the precinct was already in CD-2. Second, the portion that was moved into CD-2 is overwhelming White with a BVAP of only 27.5%, meaning, if anything, it would "unpack" CD-2. Finally, Dr. Williamson fails to account for evidence that this precinct was split in 2013, and the 2021 map simply unifies that previously split precinct.[23]

Dr. Williamson takes issue with the movement of precinct 2450 into CD-2 because of its

[23]See Stephenson Deposition, pgs. 38, 94 and public statements by the commission to this end: JCCAL-2021-11-04 COMMISSIONMEETING, pg. 40.

majority BVAP population (59.2%). He suggests this is evidence of racial packing.[24] However, he does not note that this precinct would make little difference to the racial composition of either CD-5—from which it was removed—or CD-2—to where it was placed—in the 2021 redraw. Furthermore, what impact it does have on CD-2 is to decrease, not increase, the BVAP of the district. Moreover, this precinct was moved in tandem with the neighboring precinct, 2095, which is majority White.

Dr. Williamson conducts a t-test to determine if the Black share of the precincts added to District 2 are statistically different than the overall Black share of the other precincts already included in District 2. This is the incorrect approach for three reasons.

First, Dr. Williamson fails to consider the implications of the results that he finds using his t-test in District 2. Dr. Williamson states, "For precincts that were moved into CD 2, the average Black CVAP was 39.15 percent. For the precincts that remained in CD 2, the average Black CVAP was 73.56 percent. Using a difference of means tests, I conclude that this difference is statistically significant and therefore not random (p=0.0055)" (Williamson Report, pg. 9). This result suggests the opposite of a racial gerrymander of CD-2. If CD-2 is, as plaintiffs allege, a racially packed and gerrymandered district, then one would "unpack" the district by adding precincts with lower BVAP. That is exactly what happened and it is reflected in Dr. Williamson's test.

Second, in determining if the precincts added to CD-2 were chosen because of race, the more appropriate test would be to compare the precincts that were added to *other precincts not already in CD-2 that could have been chosen instead*. Dr. Williamson does not do this. Instead he compares the added precincts to the existing precincts in CD-2. This is not informative about the motivation for why particular precincts were added to CD-2 and why others were not. It only tells us if these precincts are different than the existing precincts in CD-2.

The third error in Dr. Williamson's approach is to not consider alternative explanations for why precincts are added to a district. If plaintiffs' experts are to identify race as a predominant motive for the district boundaries, then they must evaluate if other explanations fail to explain

[24]See Williamson Report, pg. 5, "In the updated maps, this precinct has been moved into the majority Black CD 2, indicative of the packing of Black citizens."

the districts as well as race. The analysis below addresses both of the issues identified above by conducting a statistical analysis that includes all precincts that could be added to CD-2 and considers if race is a better explanation than other factors for why certain precincts are added and others are not. To do so I assemble all precincts in the county except for those already in CD-2. These constitute the universe of possible precincts that could be added. I then conduct a regression analysis in which being added to CD-2 is regressed on the precincts' racial composition (BVAP), population, and a variable indicating if the precinct is adjacent to the old CD-2 boundary. In this way, we can see if race is a statistically significant predictor of inclusion in CD-2 over and above two other obvious variables - population and geographic proximity.

Table 5 shows that when specified in this way, race is not a statistically significant predictor of which precincts are added to CD-2. The only significant predictors are population and geographic proximity, which makes sense if the objective of the map drawers was a least change approach that added precincts to balance population that minimally changed the shape and orientation of the existing districts.

Mr. Fairfax also notes in his report that the movement of population into District 2 is not well explained by race. He states, "The size of Black and White populations added to District 2 are almost comparable to each other, with neither in the majority. Almost 41% (40.95%) of the population added were Black, while 46% (46.47%) were White" (Fairfax Report, pg. 38-39).

Table 5: Precinct Movement into CD-2

	Dependent Variable:
	Precinct Moved Into CD-2
Total Population (in 1,000s)	-0.017^{**}
	(0.008)
Black VAP%	-0.0003
	(0.001)
Precinct Adjacent to Old CD-2	0.204^{***}
	(0.047)
Constant	0.091^{**}
	(0.042)
Observations	147
Adjusted R^2	0.141
Note:	*p<0.1; **p<0.05; ***p<0.01

3.3 District 3

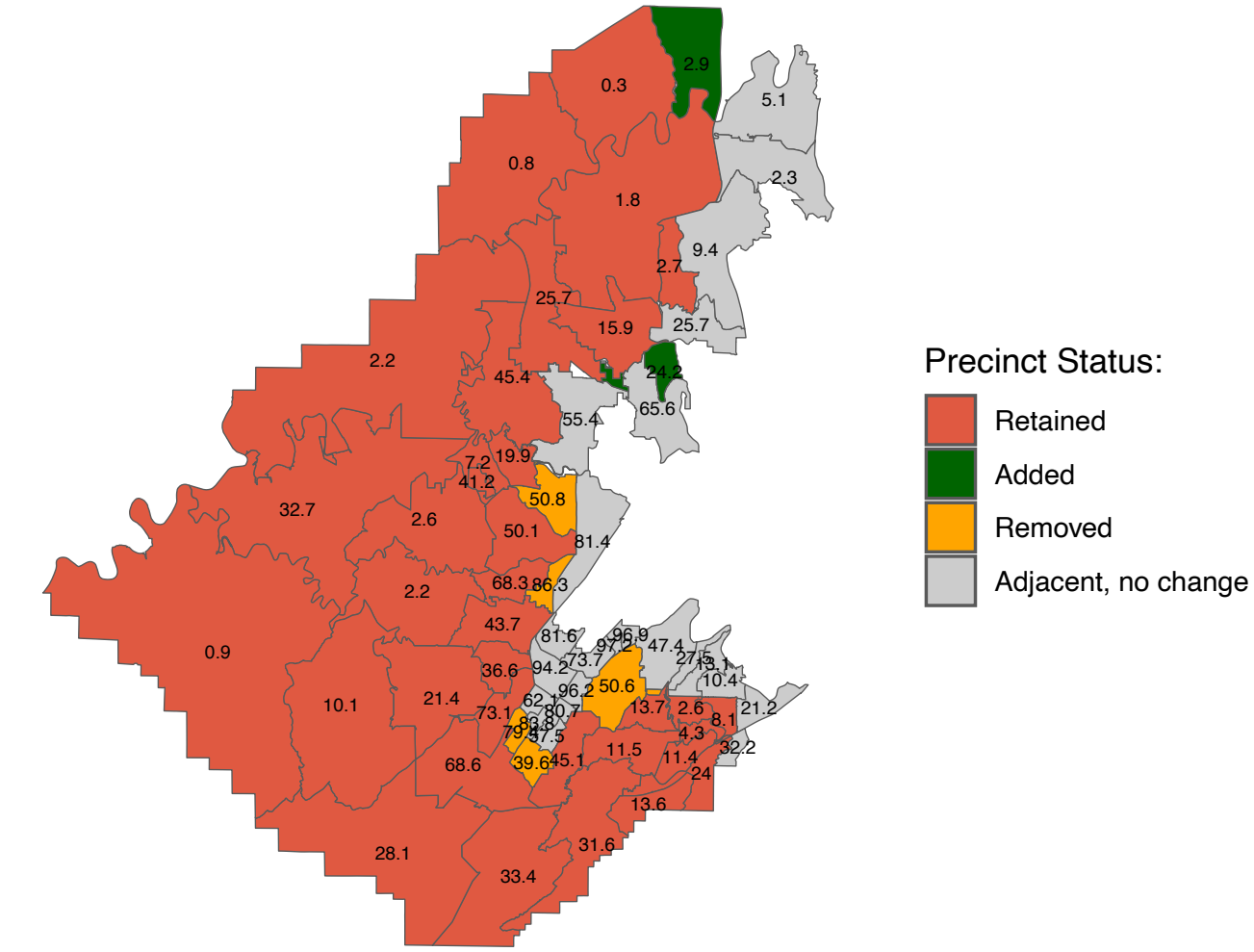
District 3 was overpopulated at the time of the 2020 Census and contained 142,799 people, 7,855 more than the target district population in 2020.[25] Therefore, the new district would need to have a net decrease in population. This was accomplished by adding population from precincts in District 3 that bordered Districts 2 and 1, both of which were underpopulated in 2020. These movements of population out of District 3 left the district slightly underpopulated. To account for that, small shifts were made from District 1 to 3 and from District 4 to 3.

At the time of the 2010 Census, District 3 had a BVAP of 21.7%. By the end of the decade, due to shifts in population, at the time of the 2020 Census the district had a BVAP of 28.6%, but was overpopulated by several thousand people. Following the redraw in 2021 the district had a BVAP of 25.8% using the 2020 Census data.

Figure 12 shows a map of the precincts in old District 3 and those that bordered it. The precincts are color coded by whether they were retained, added, or removed to District 3 during the 2021 redraw. The BVAP of each precinct is also noted in the figure. As seen in the figure, portions of 5 precincts were removed from CD-3 and portions of 2 precincts were added to CD-3.

[25] There are small differences in the population of the district at the time of the 2020 census. The Cooper report lists old District 3 having a population of 142,865 in 2020 and the Fairfax report also lists District 3 as having a population of 142,865. The County's report (exhibit JCC0000002-JCC0000018) lists the population as 142,776.

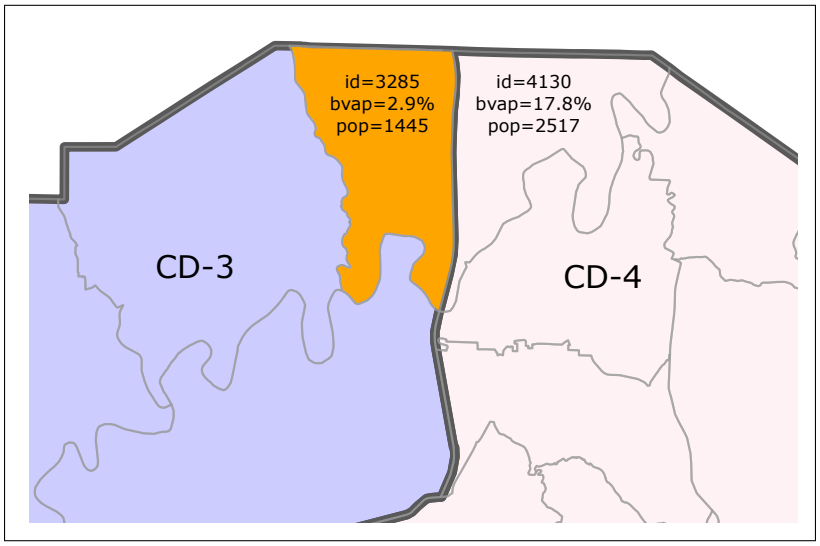
Figure 12: 2013 CD-3 Precincts and Border Precincts



Previous sections of this report detail the precincts that were moved from CD-3 into CD-1 (See Figure 4) and CD-2 (See Figure 9) as well as the small area that was moved from CD-1 to CD-3 to make it easier for voters to travel to a closer polling location (See Figure 3).

The remaining precinct change that impacts CD-3 is a shift of population between CD-3 and CD-4 in the northernmost part of the county, near the community of Warrior. To do this, precinct 4130 (Warrior Storm Shelter) was divided and the western half of the precinct (now numbered precinct 3285) was added to CD-3 while the eastern half of the precinct remains in CD-4. The precinct split now follows I-65, a major interstate that runs through the county. Following large natural and manmade boundaries such as rivers, railroads, and major roads is a common redistricting principle. Figure 13 shows the precincts in question and displays the BVAP and population of each section of the precinct.

Figure 13: Precinct Divided and Moved into CD-3 from CD-4



Note: The 2021 district border is shown with a bolded black line. The portion of precinct 4130, now numbered precinct 3285, that was moved from CD-4 to CD-3 is highlighted in orange.

Dr. Williamson discusses this population shift and claims it is evidence of racial packing.[26] Dr. Williamson's discussion of this small change in the northern-most portion of Jefferson County illustrates Plaintiffs' experts two overriding errors. Dr. Williamson blinds himself to other obvious explanations for that change, and Dr. Williamson assumes that any change affecting the district's resulting BVAP is evidence that race was the basis for the change. As noted above, the district line shifted east to follow I-65, instead of a small creek.[27] As for the resulting change

[26]Dr. Williamson's exact words are, "The Black citizens are primarily located in the eastern part of the left panel, and the new divide between precincts 3285 and 4130 concentrates them in one precinct within a substantially white CD 4" (Williamson Report, pg. 7)

[27]See Stephenson Declaration, para. 30

to the BVAP of both districts, Williamson ignores that the entire 2013 precinct had a relatively low BVAP to begin with (12.6%).

Neither the western nor eastern portion of the precinct have an especially high BVAP, as is shown in Figure 13. The portion of the precinct that was moved into CD-3 has a BVAP of 2.9%. The portion of the precinct that remained in CD-4 has a BVAP of 17.8%. Dr. Williamson states that this precinct division places the Black population of precinct 4130 in a "substantially white CD 4." The problem with this assertion is that while CD-4 is substantially white (WVAP of 65.1%), the same is true of CD-3 (WVAP of 66.6%). Given the location of this precinct at the northern border of the county, CD-3 and CD-4 are the only reasonable options for locating this precinct. Thus, the Black voters in this precinct will reside in a majority white district regardless of whether the precinct is wholly contained in CD-4, CD-3, or split between the two districts. The choice to divide this precinct along the freeway and place some voters in CD-3 and others in CD-4 is not at all explained by racial considerations.

3.4 District 4

District 4 was overpopulated at the time of the 2020 Census and contained 142,052 people, 7,108 more than the target district population in 2020.[28] Therefore, the new district would need to have a net decrease in population. This was accomplished by shifting population from precincts in District 4 that bordered District 1, which was underpopulated in 2020. Additional population from a portion of a single precinct was moved from CD-4 to CD-3, as discussed in the previous section. These movements of population out of District 4 left the district slightly underpopulated. To account for that, a single precinct was moved from District 5 to 4 (precinct 4125, Hope Community Church).

At the time of the 2010 Census, District 4 had a BVAP of 22.4%. By the end of the decade, due to shifts in population, at the time of the 2020 Census the district had a BVAP of 29.5%, but was overpopulated by several thousand people. Following the redraw in 2021 the

[28]There are small differences in the population of the district at the time of the 2020 census. The Cooper report lists old District 4 having a population of 142,059 in 2020 and the Fairfax report also lists District 4 as having a population of 142,059. The County's report (exhibit JCC0000002-JCC0000018) lists the population as 142,111.

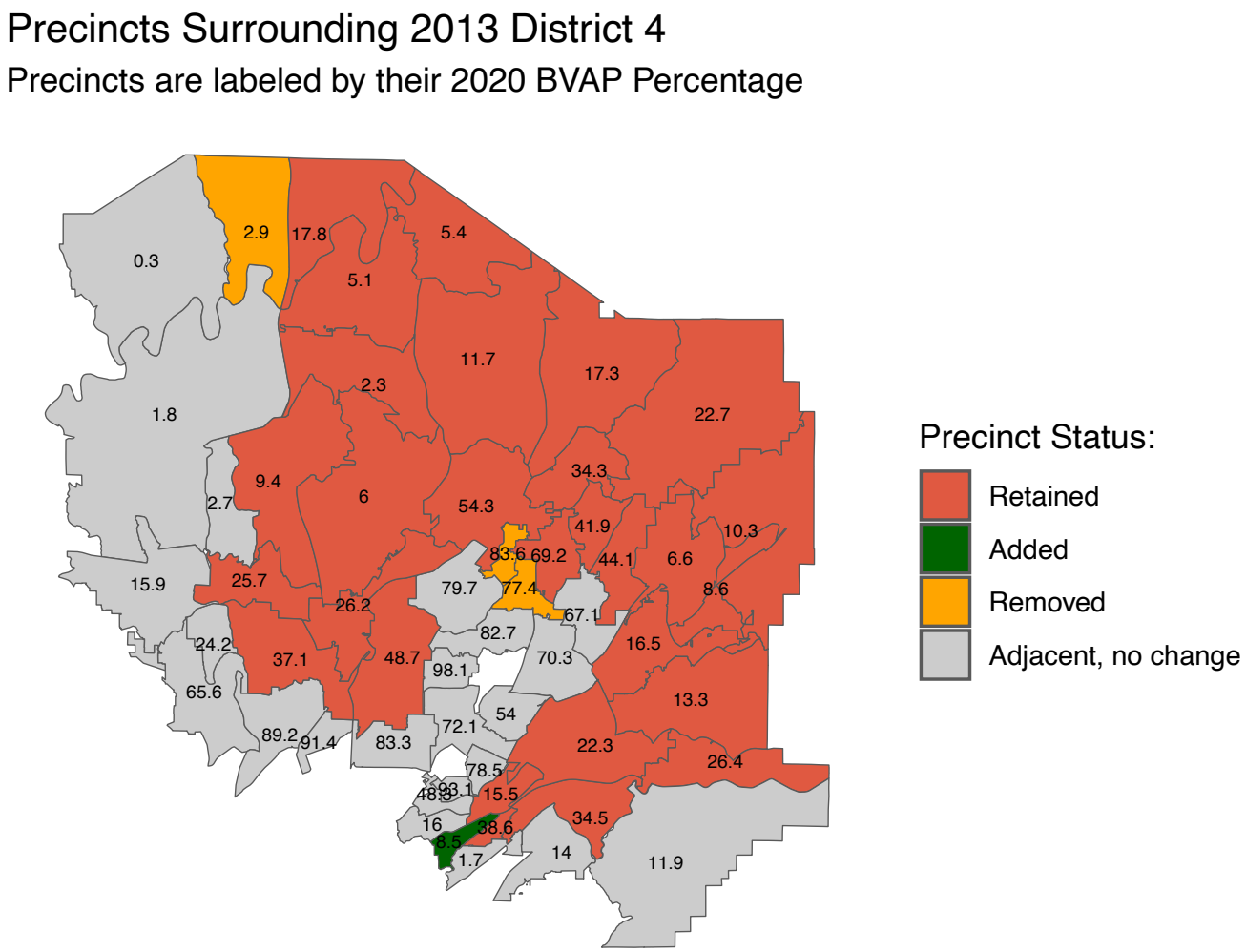
district had a BVAP of 25.7% using the 2020 Census data.

Figure 14 shows a map of the precincts in old District 4 and those that bordered it. The precincts are color coded by whether they were retained, added, or removed to District 4 during the 2021 redraw. The BVAP of each precinct is also noted in the figure. As seen in the figure, portions of 3 precincts were removed from CD-4 and 1 precinct was added to CD-4.

Previous sections of this report detail the precincts that were moved from CD-4 into other districts: CD-1 (See Figure 5) an CD-3 (See Figure 13).

The remaining precinct change that impacts CD-4 is a shift of population between CD-5 and CD-4. To do this, precinct 4125 (Hope Community Church) was added to CD-4 from CD-5. This shifted 4,787 people from District 5, which was overpopulated by several thousand people, to District 4, which was underpopulated after population had been shifted from District 4 to other districts. None of the plaintiffs' experts appear to take issue, specifically, with the movement of this precinct from District 5 to District 4, which I take to indicate that this precinct move, in their view, is not indicative of racial gerrymandering.

Figure 14: 2013 CD-4 Precincts and Border Precincts



3.5 District 5

District 5 was the most overpopulated of the districts at the time of the 2020 Census and contained 145,823 people, 10,879 more than the target district population in 2020.[29] Therefore, the new district would need to have a net decrease in population. This was accomplished by moving population from District 5 to District 2, which was underpopulated in 2020. Additional population from a single precinct was moved from District 5 to 4 (precinct 4125, Hope Community Church).

At the time of the 2010 Census, District 5 had a BVAP of 11.0%. By the end of the decade, due to shifts in population, at the time of the 2020 Census the district had a BVAP of 14.1%, but was overpopulated by several thousand people. Following the redraw in 2021 the district had a BVAP of 14.0% using the 2020 Census data.

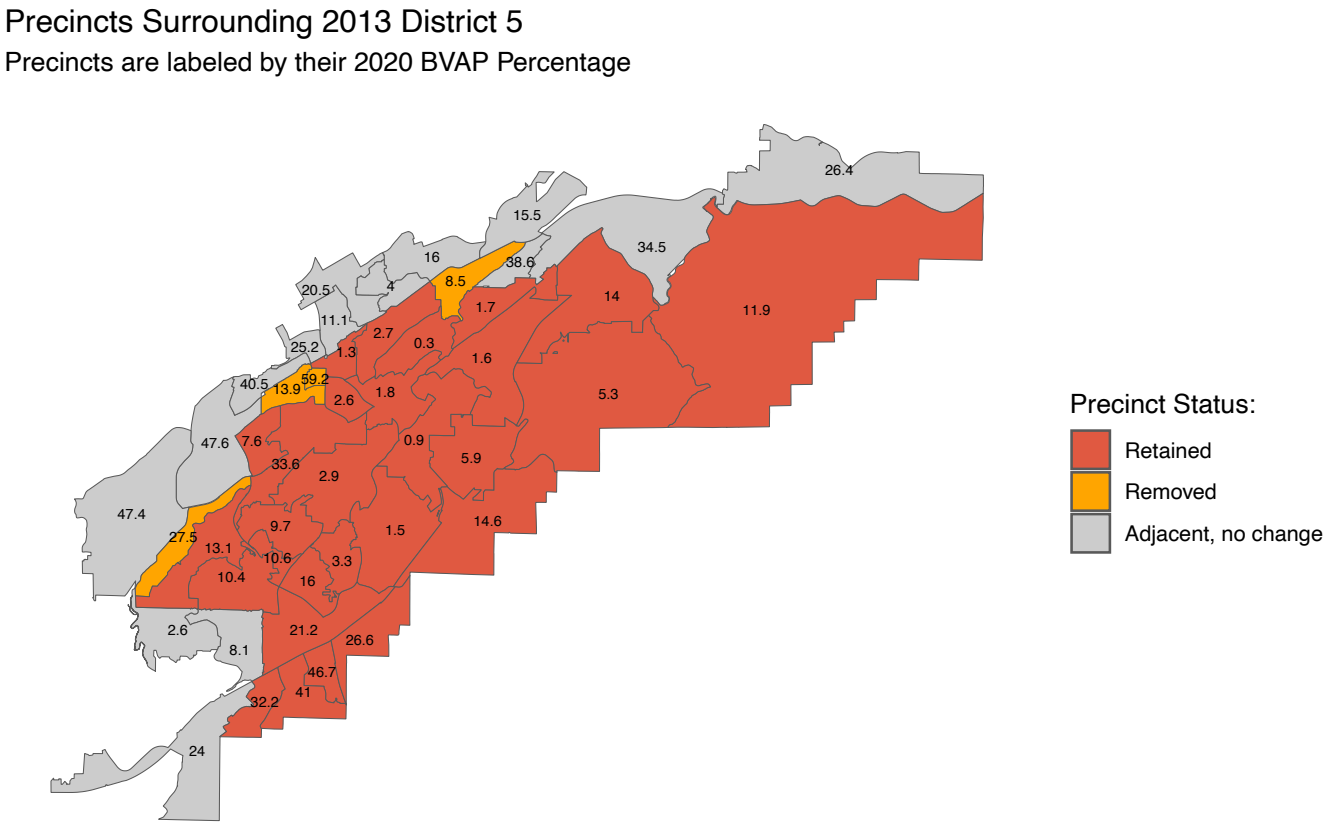
Figure 15 shows a map of the precincts in old District 5 and those that bordered it. The precincts are color coded by whether they were retained, added, or removed to District 5 during the 2021 redraw. The BVAP of each precinct is also noted in the figure. As seen in the figure, portions of 4 precincts were removed from CD-5 and no precincts were added to CD-5.

As can be seen in the map, the shifts of population out of CD-5 are along the border between District 5 and Districts 2 and 4. A simple explanation for these shifts is a desire to unify split precincts (in the case of precinct 2350, Oxmoor Valley Community Center) and shift population from an overpopulated district to an under populated district.

Plaintiffs' experts claim that race predominated in the decisions about where to move population out of District 5 and into adjacent districts. These claims are unfounded and overblown. Mr. Fairfax states that "District 5 increased its White percentage from 74.57% in the Pre 2020 Plan to 74.93% in the Adopted 2021 Plan" (Fairfax Report, pg. 23) In other words, by Mr. Fairfax's calculations, the White percentage of District 5 changed by less than one half of one percent (0.36%). In another section of his report, Mr. Fairfax states that "The majority Black District 5 removes a population that is 16.10% Black while District 5's population of the Pre

[29]There are small differences in the population of the district at the time of the 2020 census. The Cooper report lists old District 4 having a population of 146,049 in 2020 and the Fairfax report lists District 4 as having a population of 146,038. The County's report (exhibit JCC0000002-JCC0000018) lists the population as 145,773.

Figure 15: 2013 CD-5 Precincts and Border Precincts



2020 Plan is 14.70% Black." Aside from the incorrect statement that District 5 was ever majority Black, this statement again tries to make a small, representative, change seem large. By Mr. Fairfax's calculations, the difference in the Black population between those retained in District 5 and those removed from District 5 is less than 2 percentage points (16.1 - 14.7 = 1.4 percentage points).

There exist much better and more logical explanations for these changes. As discussed in the section above about District 2, shifts in population between District 5 and District 2 are best explained by moving population from an overpopulated district to an underpopulated

district using precincts that unify previously divided precincts and are near to the border between District 5 and other districts.

4 Williamson Report Errors

Dr. Williamson's report purports to show, district-by-district and precinct-by-precinct, how changes were made from the 2013 map to the 2021 map. However, there are numerous errors in the report that render it nearly useless in providing any helpful information about whether or not race predominated in the drawing of the enacted map.[30] I will detail these mistakes in this section.

The first mistake that Dr. Williamson makes is that he computes the Black Citizen Voting Age Population (BCVAP) for VTDs and not precincts. As has been discussed elsewhere in this case, the county uses precincts and not census-defined VTDs in its redistricting.[31] While these two units often overlap, there are many places where they do not. As a result, the BCVAP numbers provided by Dr. Williamson in his backup materials are, in many cases, different than the BCVAP numbers for the precincts that compose the different districts. This will lead to a small degree of difference when looking at VTDs versus precincts, and this discrepancy is also present in the other expert reports as well.

However, even if we set this issue aside, there are numerous, much larger, problems with the analysis conducted by Dr. Williamson. All of these problems result in incorrect calculations for the racial composition of the districts, the portions that are moved, the portions that are retained, and the overall effect of those changes. These errors issues include:

- Considering entire VTDs "moved" when only portions of VTDs were moved between districts. (e.g. precincts 3060, 2350, 4130)
- Incorrectly classifying VTDs that are moved or unmoved between districts. (e.g. 1285, 3010)

[30] I was provided the file "jeff_co_data.xlsx" as part of the Williamson Reliance materials.
[31] See the Stephenson Declaration, para. 34.

- Duplicating several VTDs in the dataset to double or even triple count them in the data. (e.g. 5270, 2350)
- Including precincts that have no name and cannot be identified on the map.
- Deleting BCVAP data for a VTD without explanation. (precinct 3035)

These errors and omissions lead me to have very little confidence in the statistical results produced by Dr. Williamson.

Even if I accept Dr. Williamson's data as accurate (which I do not), my replication of his statistical analysis fails to produce the results that he presents in his report. In one of the five districts (CD-3), following his replication code produces a different estimate for the BCVAP of precincts moved from the district. Dr. Williamson states, "For precincts that were moved out of CD 3, the average Black CVAP was 60.78 percent. For the precincts that remained in CD 3, the average Black CVAP was 34.77 percent" (Williamson Report, pg. 8). Executing his statistical code produces something different - for precincts that were moved out of CD 3, the average Black CVAP was 52.18 percent. For the precincts that remained in CD 3, the average Black CVAP was 25.56 percent. However, it is hard to know if these results are even correct given that there are additional errors in the underlying data themselves.

In all of the districts my replication of his analysis produces different p-values (the measure of statistical significance). The reason for this is that Dr. Williamson uses what is called a one-tailed p-value as opposed to the more common approach of a two-tailed p-value.[32] While the difference is somewhat deep in the statistical weeds, the result of this choice is that Dr. Williamson's use of a one-tailed p-value doubles his chances of finding a statistically significant result. When using the two-tailed p-value, the results in District 5 fail to be statistically significant (i.e. the p-value is larger than 0.05).[33]

[32]Ludbrook, John. "Should we use one-sided or two-sided P values in tests of significance?." Clinical and Experimental Pharmacology and Physiology 40, no. 6 (2013): 357-361.

[33]See Gerber, Alan, and Neil Malhotra. "Do statistical reporting standards affect what is published? Publication bias in two leading political science journals." Quarterly Journal of Political Science 3, no. 3 (2008): 313-326, who show that a two-tailed test is nearly twice as common in recent publications in top political science journals.

5 Cooper Report

Mr. Cooper's analysis suffers from the same errors as other plaintiffs' experts of attributing resulting racial effect to racially predominant intent. Mr. Cooper does not offer any specific analysis of the particular precinct movements, but rather paints with a broad brush to assert that the racial composition of the 2021 commission districts illustrate racial "packing" and "cracking."

In his report, Mr. Cooper also makes a comparison between the 2021 County Commission districts and State Senate districts drawn in 2018 and 2021 by the Alabama State Legislature. This comparison is unhelpful and provides no useful information about whether or not the county commission districts are racially gerrymandered. Mr. Cooper focuses on Senate Districts 18, 19, and 20, which he states show that, "Three majority-Black Commission districts could be drawn with ease in and around SDs 18, 19, and 20" (Cooper Report, pg. 11).

The first problem with this comparison is that no one in this case, from what I have seen, is arguing or requesting that the county needs to draw three majority Black districts. In fact, none of the plaintiffs' own illustrative maps contain three majority Black districts. Second, if the county had adopted commission districts similar to State Senate districts 18, 19, and 20, the remaining two county commission districts would have to snake around these three majority-Black districts to form two "border collar" districts at the edge of the county that would be, in many cases, only one precinct wide. This district arrangement would violate a number of traditional redistricting criteria (e.g. municipal splits, compactness, prior district orientation) and would itself be suspect as being drawn with race as the predominant factor. Third, these three state senate districts were drawn while considering the 33 other state senate districts and the overall composition of the state legislature. They were very likely not drawn with any consideration given to the shape of the 2013 county commission districts and therefore give no weight to retaining the population of the previous commissioner districts. Finally, the shape of state legislative districts is uninformative about the shape and configuration of county commissioner districts because the two bodies serve entirely different purposes. The reasons, whatever they may be, for why the state legislative districts look the way they do reflect considerations of the state legislature, which deals with issues at the state level. These issues, concerns, policies, and

other considerations are very different from the issues, concerns, policies, and other considerations that a county commission will face. And as such, we might reasonably expect the two sets of districts to be drawn in very different ways for reasons entirely separate from race.

6 Illustrative Maps

The plaintiffs' experts put forward four illustrative maps. In my view, these maps do not suggest whether or not the enacted map is a racial gerrymander. The reason for this is that all of the illustrative maps fail to consider the criteria that was clearly most important to the commission (after equal population and geographic contiguity), which was consideration of the previous district boundaries and retention of the population from the 2013 districts. Thus, what the plaintiffs' maps show is that a map that deviates from the criterion of district population retention by prioritizing other criteria looks different. That should come as no surprise. It would be more instructive to produce an illustrative map that has similar levels of core retention to the enacted map with a dramatically different racial composition for the plaintiffs to show that the enacted map is a racial gerrymander. This would illustrate that race, and not preservation of previous district boundaries, was prioritized, or that it is at least possible to achieve similar levels of retention with different racial outcomes. None of the illustrative maps do this.

Table 6 shows the percent of the population that is moved from the 2013 district into new districts, either in the 2021 enacted map (second column) or the four illustrative maps (columns 3-6). The final row of the table shows the overall percent of the population that is not moved into a new district. The enacted map dramatically out performs the illustrative maps, which at best retain 70% of the population. At the least (Cooper A), the difference in retention scores between the enacted and illustrative plans results in 168,000+ additional people being moved into a new district. At most (Cooper C), this represents 226,000+ more people being moved from their previous district than in the enacted map.

The same is true of how the illustrative maps divide the population of Birmingham, Jefferson County's largest city. Table 7 shows the splitting of Birmingham for each of the

Table 6: Splitting of 2013 Districts by 2021 Districts and Illustrative Plans

	Percent Retention of 2013 Districts				
District	2021 Enacted	Cooper A	Cooper B	Cooper C	Fairfax
1	0.900	0.614	0.561	0.563	0.564
2	0.901	0.707	0.678	0.669	0.644
3	0.989	0.722	0.451	0.443	0.707
4	0.964	0.666	0.679	0.754	0.766
5	1.000	0.800	0.720	0.716	0.726
Total	0.951	0.702	0.619	0.629	0.682

Note: Reading down each column shows the proportion of the population in each 2013 district that is retained in each of the 5 districts for each plan. For example, 2021 District 1's population is 90% from 2013 District 1 whereas the Cooper A map's District 1 retains 61% of the population from the 2013 District 1.

illustrative plans as well as the enacted map. The bottom row of the table shows the proportion of the city's population that are not contained in the two districts that contain the largest share of the city's population. in other words, because the city is too large to be contained within a single district, any plan will split the city's population across two districts. However, the city's population is small enough that it could fit within two districts, so any division beyond two districts is not a function of population, but rather a combination of the city's geography (which is held constant across the various maps) or decisions to either prioritize or deprioritize the retention of Birmingham's population in fewer districts (which varies across the different maps).

The enacted map keeps all but 6.6% of Birmingham's population in Districts 1 and 2.[34] This is the largest share of the city's population to be kept within two districts of any of the maps in Table 7. All three of Mr. Cooper's illustrative maps place more than twice the population of Birmingham outside of two districts when compared to the enacted map (approximately 14,000 additional people). Mr. Fairfax's map does somewhat better but is still behind the enacted map (by approximately 5,000 additional people).

These results again only show that the illustrative maps prioritized different criteria when constructing the county commission districts. However, they do not show us whether or not race

[34]These calculations only consider the population of Birmingham that reside within Jefferson County. A small portion of the city extends beyond the county boundary into Shelby County.

was the criteria that could not be compromised in the drawing of the enacted map. What we do see is that they gave lower priority to maintaining the existing district boundaries and keeping the population of Birmingham within fewer districts.

Table 7: Splitting of Birmingham Population by 2021 Districts and Illustrative Plans

	Population Retention of Birmingham				
District	2021 Enacted	Cooper A	Cooper B	Cooper C	Fairfax
1	0.426	0.373	0.405	0.405	0.448
2	0.508	0.478	0.455	0.458	0.460
3	0.001	0.052	0.104	0.104	0.043
4	0.042	0.026	0.005	0.000	0.039
5	0.023	0.071	0.032	0.032	0.011
Outside Dists 1 and 2	0.066	0.149	0.140	0.137	0.093

Note: Reading down each column shows the proportion of Birmingham's population contained in each district. The final row shows the share of Birmingham's population that is not within either District 1 or District 2.

7 Simulation Analyses

Another approach that has been used in previous racial gerrymandering cases to identify if race was a predominant factor in the drawing of a map is the introduction of "simulated maps," or computational redistricting algorithms. Simulated districting analyses allow a person to produce a large number of districting plans that follow traditional redistricting criteria using small geographic units as building blocks for hypothetical legislative districts. The user instructs the simulation algorithm to ignore racial considerations when drawing districts. In doing so the computer simulations are programmed to create districting plans that follow traditional districting criteria without considering criteria *not* provided by the user to the computer. These intentionally omitted factors could be things such as partisanship, the location of incumbent lawmakers, or in the situation of a racial gerrymandering case, information about the race of voters.

The set of simulated districts (often referred to as a redistricting ensemble) is helpful because it provides a set of maps to which one can compare the enacted map that also accounts

for the geographic distribution of voters. Because a state's racial geography is unique and voters are not distributed evenly across the county, we cannot evaluate the racial metrics of a proposed plan without an apples-to-apples comparison.

By comparing an enacted map to the set of simulated maps, we can evaluate if the racial patterns observed in the enacted map are due to the political geography of the state because the simulated maps are also drawn *using the same political geography.* In other words, by comparing the enacted maps to the simulated districts, we are comparing the state's map to a set of alternative maps while holding constant the political geography of the state. If the maps in question produce a similar outcome as the alternative set of simulated maps, we may reasonably conclude that the enacted map considered the same criteria used to produce the simulated maps and did not consider criteria not included in the simulated map - including race.

Alternatively, if the enacted map significantly diverge from the set of simulated maps, this suggests that some other criteria that were not used in drawing the ensemble maps may have influenced the decisions made in drawing the enacted map. This means that the factors that are omitted from the simulations (i.e. race) may have predominated in drawing the maps in question. In other words, these simulated maps help the court to evaluate the degree to which the enacted map used race as a predominant factor by showing what a set of maps that do not consider race look like.

A simple analogy is helpful. If I bake a cake, I might wonder how important the eggs were to producing a successful cake. One way to find out is to bake another cake without eggs and then compare the differences between the original recipe and the eggless cake. By removing the ingredient in question, we can identify the importance of that factor in the final product. Chen and Stephanopolous's amicus brief to the US Supreme Court (2023) in *Alexander v. South Carolina* provide an good summary of this argument.[35]

The process of simulating districting plans has been recognized and used in a variety of redistricting litigation, including in racial gerrymandering cases.[36] While different people employ

[35]https://www.supremecourt.gov/DocketPDF/22/22-807/275639/20230818110350391_22-807%20Alexander%20v%20SC%20State%20Conf%20of%20the%20NAACP%20BRIEF.pdf

[36]See *Raleigh Wake Citizens Ass'n v. Wake Cnty. Bd. of Elections, City of Greensboro v. Guilford Cnty. Bd. of Elections, Singleton v. Merrill, 582 F. Supp. 3d 924 (N.D. Ala. 2022), Jacksonville Branch of NAACP v.*

slightly different methods, the overall process is much the same. For my simulations, I use what is referred to as a sequential Monte Carlo (SMC) algorithm, variations of which have been used by a number of different academics.[37] The particular application I use was developed by Kenny et al. (2020). I provide here an overview of the procedure while leaving the detailed information of the implementation of the algorithm to the backup materials provided with this report.[38]

Specifically, the algorithm generates 5 county commission districts by assembling small geographic units — electoral precincts — into larger groups until a group of precincts is large enough to constitute a new district. It then repeats this process a large number of times (100,000 in this case), generating a different set of 5 districts with each run of the model.[39] In each of the 100,000 iterations of the model, the algorithm generates geographically contiguous districts that contain equal population and avoid dividing cities, while also giving no weight to the race of voters.

Once the simulated district plans are complete, I compute the share of the voting age population in each district that are Black (BVAP) and the number of districts in each of the 100,000 simulation runs that have a majority Black voting age population. I lastly only consider simulations that produced at least two majority-Black districts due to VRA considerations[40]

It is important to differentiate my use of simulations here and what was used in Alabama in *Allen v. Milligan*. My understanding of the facts of the case is that redistricting simulations were used by the defense to suggest that the congressional map in Alabama should only contain

City of Jacksonville, and Alexander v SC State Conf of the NAACP.

[37]McCartan, Cory, Christopher T. Kenny, Tyler Simko, George Garcia III, Kevin Wang, Melissa Wu, Shiro Kuriwaki, and Kosuke Imai. "Simulated redistricting plans for the analysis and evaluation of redistricting in the United States." Scientific Data 9, no. 1 (2022): 689.

Kenny, Christopher T., Shiro Kuriwaki, Cory McCartan, Evan TR Rosenman, Tyler Simko, and Kosuke Imai. "The use of differential privacy for census data and its impact on redistricting: The case of the 2020 US Census." Science advances 7, no. 41 (2021): eabk3283.

Becker, Amariah, Moon Duchin, Dara Gold, and Sam Hirsch. "Computational redistricting and the voting rights act." Election Law Journal: Rules, Politics, and Policy 20, no. 4 (2021): 407-441.

[38]McCartan, Cory, and Kosuke Imai. "Sequential Monte Carlo for sampling balanced and compact redistricting plans." arXiv preprint arXiv:2008.06131 (2020).

Fifield, Benjamin, , Michael Higgins, Kosuke Imai, and Alexander Tarr. "Automated redistricting simulation using Markov chain Monte Carlo." Journal of Computational and Graphical Statistics 29, no. 4 (2020): 715-728.

Fifield, Benjamin, Kosuke Imai, Jun Kawahara, and Christopher T Kenny. 2020. "The essential role of empirical validation in legislative redistricting simulation." Statistics and Public Policy 7 (1): 52–68.

[39]By virtue of building districts by assembling precincts, the districts produced by the simulations contain no split precincts.

[40]At the instruction of counsel, .

a certain number of majority-Black districts. In other words, the simulations were being used to affirmatively suggest that drawing more majority-Black districts than resulted from the simulations was not justified under Section 2 of the VRA. That is not my intention here with the use of simulations. Here, I am using the simulations to provide a benchmark of what a representative map drawn without any consideration of race (while still considering the other traditional redistricting criteria) would likely look like. This allows us to note any substantial differences between the simulations and the map in question (in this case, the enacted map) which could be due to racial predominance.

The comparison to a large set of maps drawn by a redistricting algorithm is superior to a comparison to a few illustrative maps for several reasons. First, one, two, or even three illustrative maps do not show the full range of outcomes we might expect to find from the application of traditional redistricting criteria. Thus, the illustrative maps might represent a biased picture or be cherry picked to show a particular outcome. Second, the simulations are drawn with knowledge of the criteria that were given to the computer - most importantly that race was not a factor in their drawing. On the other hand, we do not know if race was not a factor, or the predominant factor, in the drawing of the plaintiffs' illustrative maps aside from their word that it was not. However, this is no different than the assertion the defense makes of the enacted map. We are absolutely certain, however, that race played no part in the creation of the simulations and therefore these maps can act as a neutral benchmark.

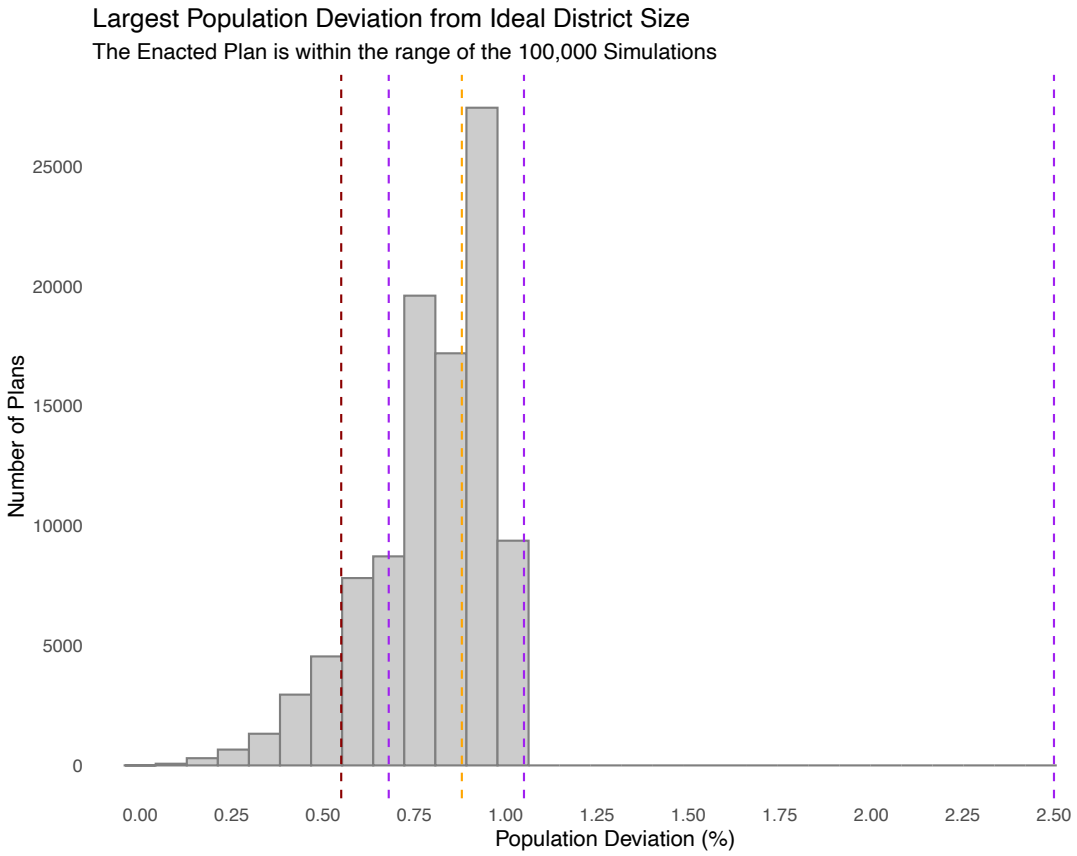
7.1 Simulation Results

I begin by showing that the ensemble of districts drawn by the computer are similar across a number of redistricting metrics to the enacted map. These results show that there are maps from the simulations (in which we are certain that race did not predominate, or play any influence whatsoever) that resemble the 2021 enacted map drawn by the county commission.[41]

[41]It is important to note that simulations are done by a computer, whereas real-life redistricting is done by people, meaning simulations are imperfect because they cannot perfectly emulate real-life redistricting by prioritizing all the criteria that were important to the map drawer. For example if a lawmaker wanted to have a particular neighborhood in her district because she had family there or if a lawmaker wanted to exclude a particular area from her district to exclude a possible political opponent. These are considerations not included

Figure 16 begins with the most basic redistricting principle - equal population. The figure shows the population deviation of the district with the largest deviation (in absolute terms) in each map. While perfectly equal population is not required, the simulations are similar to the enacted map by having no district that exceeds a 1% population deviation. The enacted map is shown by the vertical orange dashed line while the Cooper illustrative maps are shown by the purple line and the Fairfax illustrative map is shown by the red line.

Figure 16: Equal Population of Districts



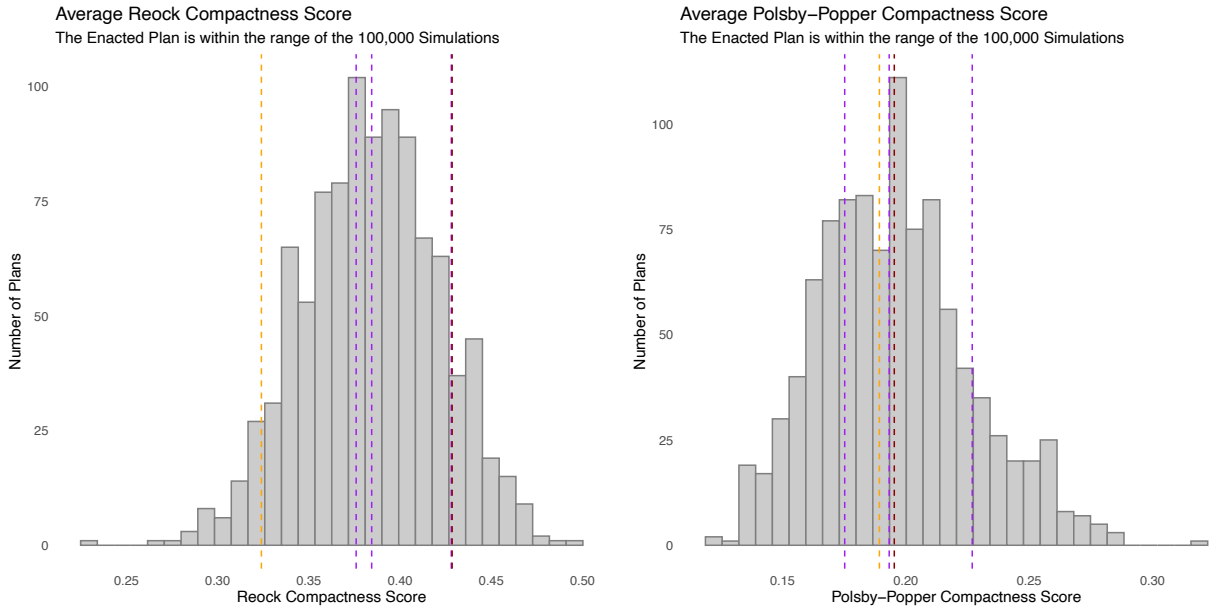
The 2021 enacted map is again shown by the vertical orange dashed line while the Cooper illustrative maps are shown by the purple lines and the Fairfax illustrative map is shown by the red lines.

Figure 17 shows the average geographic compactness of the simulations using two common measures of compactness - Polsby-Popper on the left and Reock on the right. The enacted map is again shown by the vertical orange dashed line while the Cooper illustrative maps are shown

in the simulations, and I am not suggesting that any of the simulations should be adopted as a commission map.

by the purple line and the Fairfax illustrative maps are shown by the red line. We see that by both measures of compactness the enacted map, as well as the illustrative maps, are within the range of the compactness produced by the 100,000 simulated maps.

Figure 17: Geographic Compactness



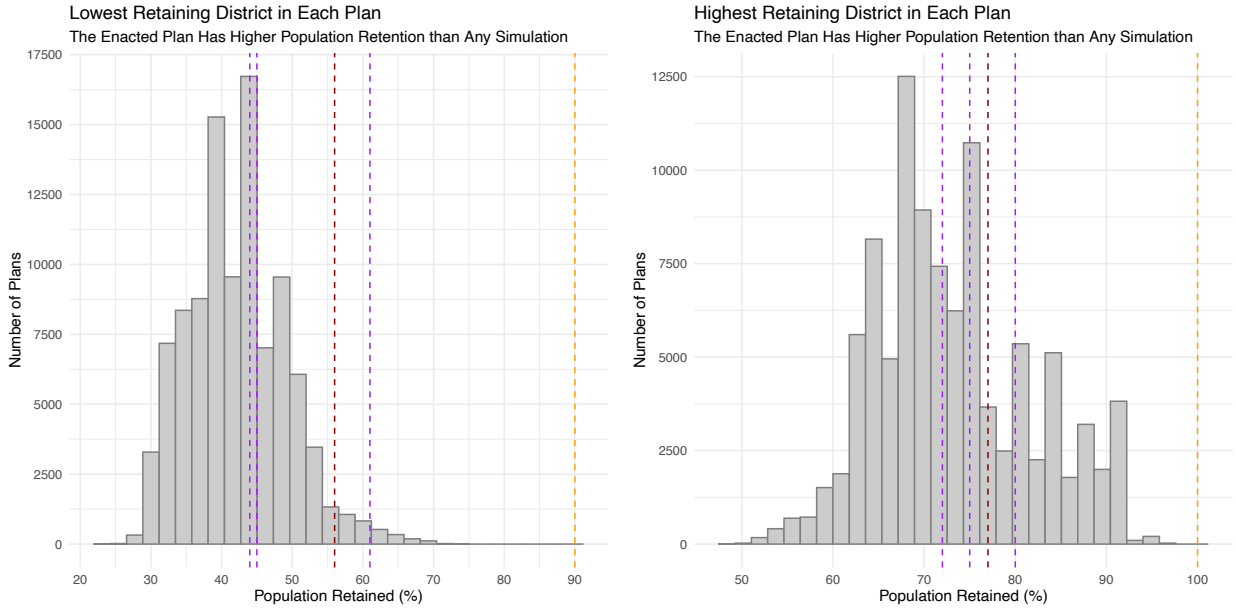
The 2021 enacted map is again shown by the vertical orange dashed line while the Cooper illustrative maps are shown by the purple lines and the Fairfax illustrative maps are shown by the red lines.

Figure 18 shows the degree to which maps in the simulations move population from the 2013 districts into the districts drawn by the redistricting algorithm. The left panel shows the distribution of population retained by the highest retaining district. In the 2021 enacted map this is District 5, which is entirely composed of population from the 2013 District 5. The right panel shows the distribution of population retained by the lowest retaining district. In the 2021 enacted map this is Districts 1 and 2, which both contain 90% of the population from the 2013 Districts 1 and 2 respectively. The enacted map is shown by the vertical orange dashed line while the Cooper illustrative maps are shown by the purple line and the Fairfax illustrative maps are shown by the red line. We see that all of the simulations and the plaintiffs' illustrative maps fail to perform as well as the enacted map on this metric of core retention.

When creating the simulations I attempted to instruct the computer to prioritize the

boundaries of the 2013 districts in a variety of different ways. In each case, the algorithm could not produce a representative set of maps that could perform as well as the enacted map on this metric. One reason for this is that there are simply not that many ways in which a person could draw a map that retains the 2013 district populations as well as the enacted map does. Because of this, the redistricting algorithm struggles to produce a large number of maps that meet this criteria. This illustrates the degree to which the enacted map prioritized retention of the 2013 districts.

Figure 18: Population Retention

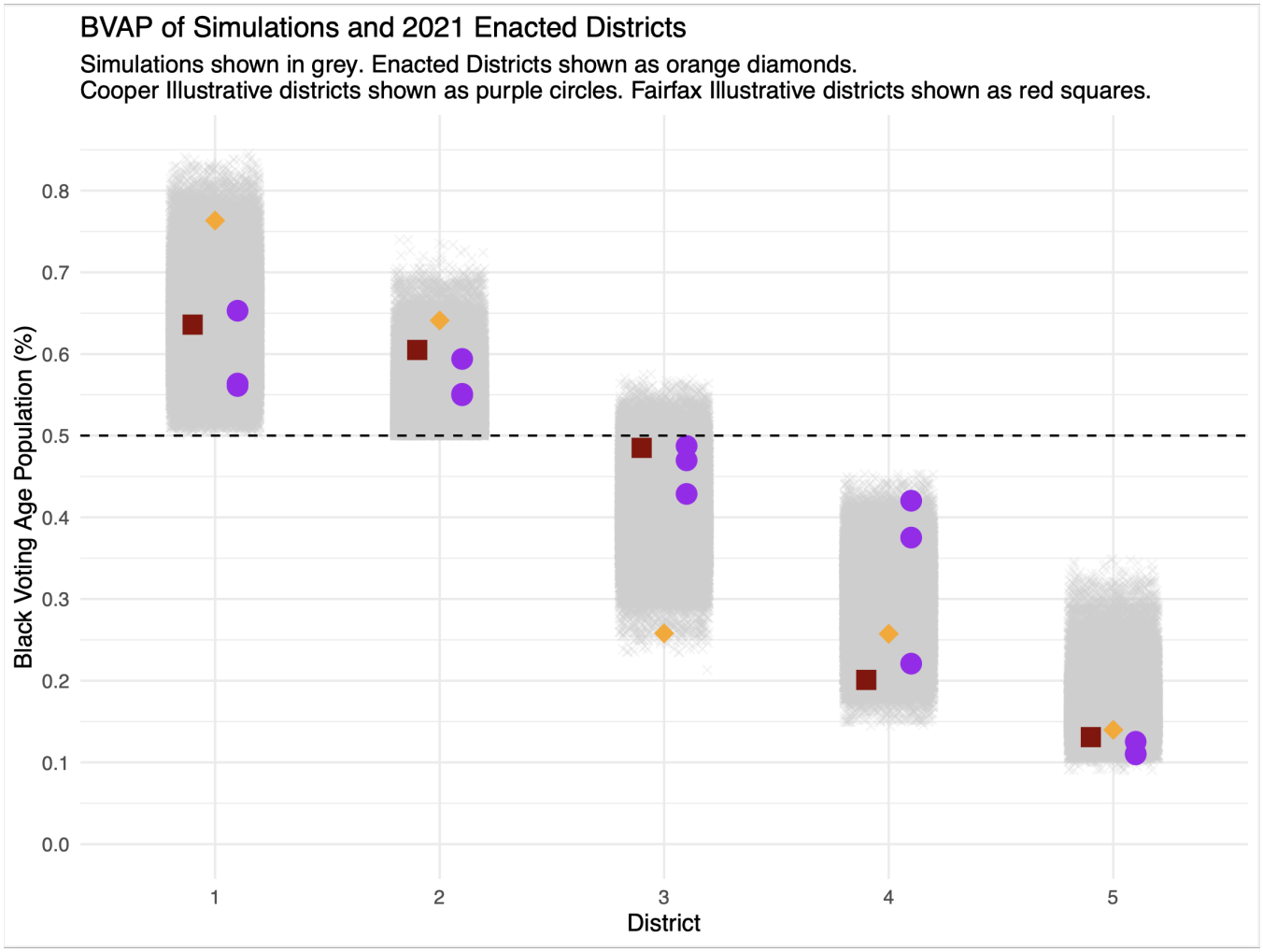


The 2021 enacted map is again shown by the vertical orange dashed line while the Cooper illustrative maps are shown by the purple lines and the Fairfax illustrative maps are shown by the red lines.

Figure 19 shows the racial composition (BVAP) of each district in the simulations (in grey), the 2021 enacted map (orange), Cooper illustrative maps (red) and Fairfax illustrative map (purple). The primary takeaway from this figure is that the enacted map is not outside the range of district BVAPs generated by the simulations. This is important because the simulations were drawn race-blind. In other words, the enacted map has a similar racial composition to maps that we know for certain were drawn in which race did not predominate. This is significant evidence against the argument that the enacted map was drawn with race as the predominant

factor. This is all the more suggestive since the simulations failed to achieve the same degree of population retention of the old 2013 districts, which would have likely brought the simulations even more in line with the enacted map on racial measures. However, the fact that the simulations and the enacted map overlap across every district is also evidence that even without relying on the principle of core retention of old districts, there are race-neutral maps from the simulations that resemble the enacted map's racial characteristics.

Figure 19: Racial Composition of Districts



8 Conclusion

The analysis I conducted to produce this report leads me to the following conclusions:

- The 2021 enacted map seeks to retain the population of the 2013 commission districts to an extremely high degree. All districts retain more than 90% of their population and the overall shift in population as a result of the 2021 redraw is less than 5% of the population of the county.

- The plaintiffs' experts make a variety of arguments regarding precinct movements as evidence of race predominating in the drawing of the 2021 map. Their analysis fails to consider alternative explanations for precinct movement that negate race as a predominant motive for these changes.

- The plaintiffs' experts put forward a series of illustrative maps. These maps do not offer much assistance in assessing the degree to which race predominated in the 2021 enacted map because they fail to consider the same non-racial factors that the commission did when drawing the enacted map.

- A large set of computer-drawn maps show that the enacted map is similar to maps drawn without race as a consideration.

- Together, these results lead me to the overall opinion that the enacted 2021 maps were drawn in a way that race was not the predominant factor.

I, Dr. Michael Barber, acting in accordance with 28 U.S.C. § 1746, Federal Rule of Civil Procedure 26(a)(2)(B), and Federal Rules of Evidence 702 and 703, hereby declare that the foregoing is true and accurate to the best of my knowledge

Michael Barber

April 11, 2024

Michael Jay Barber

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ACADEMIC APPOINTMENTS

Brigham Young University, Provo, UT

August 2020 - present Associate Professor, Department of Political Science
Jan 2023 - present Director, Center for the Study of Elections and Democracy
2014 - July 2020 Assistant Professor, Department of Political Science
2014 - Jan 2023 Faculty Scholar, Center for the Study of Elections and Democracy

EDUCATION

Princeton University Department of Politics, Princeton, NJ

Ph.D., Politics, July 2014

- Advisors: Brandice Canes-Wrone, Nolan McCarty, and Kosuke Imai
- Dissertation: "Buying Representation: the Incentives, Ideology, and Influence of Campaign Contributions on American Politics"
- 2015 Carl Albert Award for Best Dissertation, Legislative Studies Section, American Political Science Association (APSA)

M.A., Politics, December 2011

Brigham Young University, Provo, UT

B.A., International Relations - Political Economy Focus, April, 2008

- *Cum Laude*

RESEARCH INTERESTS

American politics, congressional polarization, political ideology, campaign finance, survey research

PUBLICATIONS

26. **"The Crucial Role of Race in 21st Century U.S. Political Realignment**, with Jeremy Pope
Forthcoming at *Public Opinion Quarterly*
25. **"Misclassification and Bias in Predictions of Individual Ethnicity from Administrative Records"**, with Lisa Argyle
Forthcoming at *American Political Science Review*
24. **"Partisanship and Trolleyology"**, with Ryan Davis
Forthcoming at *Research & Politics*
23. **"Does Issue Importance Attenuate Partisan Cue-Taking"**, with Jeremy Pope
Forthcoming at *Political Science Research and Methods*

22. **"A Revolution of Rights in American Founding Documents"**, with Scott Abramson and Jeremy Pope
Forthcoming at *Journal of Political Institutions and Political Economy*

21. **"Groups, Behaviors, and Issues as Cues of Partisan Attachments in the Public"**, with Jeremy Pope
Forthcoming at *American Politics Research*

20. **"Ideological Disagreement and Pre-emption in Municipal Policymaking"**, with Adam Dynes
American Journal of Political Science, no. 1 (2023): 119-136.

19. **"400 million voting records show profound racial and geographic disparities in voter turnout in the United States"**, with John Holbein
PloS One, 2022, Vol. 17, no. 6: e0268134

18. **"Comparing Campaign Finance and Vote Based Measures of Ideology"**
Journal of Politics, 2022. Vol. 84, no. 1 (2022): 613-619.

17. **"The Participatory and Partisan Impacts of Mandatory Vote-by-Mail"**, with John Holbein
Science Advances, 2020. Vol. 6, no. 35, DOI: 10.1126/sciadv.abc7685

16. **"Issue Politicization and Interest Group Campaign Contribution Strategies"**, with Mandi Eatough
Journal of Politics, 2020. Vol. 82: No. 3, pp. 1008-1025

15. **"Campaign Contributions and Donors' Policy Agreement with Presidential Candidates"**, with Brandice Canes-Wrone and Sharece Thrower
Presidential Studies Quarterly, 2019, 49 (4) 770–797

14. **"Conservatism in the Era of Trump"**, with Jeremy Pope
Perspectives on Politics, 2019, 17 (3) 719–736

13. **"Legislative Constraints on Executive Unilateralism in Separation of Powers Systems"**, with Alex Bolton and Sharece Thrower
Legislative Studies Quarterly, 2019, 44 (3) 515–548
Awarded the Jewell-Loewenberg Award for best article in the area of subnational politics published in *Legislative Studies Quarterly* in 2019

12. **"Electoral Competitiveness and Legislative Productivity"**, with Soren Schmidt
American Politics Research, 2019, 47 (4) 683–708

11. **"Does Party Trump Ideology? Disentangling Party and Ideology in America"**, with Jeremy Pope
American Political Science Review, 2019, 113 (1) 38–54

10. **"The Evolution of National Constitutions"**, with Scott Abramson
Quarterly Journal of Political Science, 2019, 14 (1) 89–114

9. **"Who is Ideological? Measuring Ideological Responses to Policy Questions in the American Public"**, with Jeremy Pope
The Forum: A Journal of Applied Research in Contemporary Politics, 2018, 16 (1) 97–122

8. **"Status Quo Bias in Ballot Wording"**, with David Gordon, Ryan Hill, and Joe Price
The Journal of Experimental Political Science, 2017, 4 (2) 151–160.

7. **"Ideologically Sophisticated Donors: Which Candidates Do Individual Contributors Finance?"**, with Brandice Canes-Wrone and Sharece Thrower
American Journal of Political Science, 2017, 61 (2) 271–288.

6. **"Gender Inequalities in Campaign Finance: A Regression Discontinuity Design"**, with Daniel Butler and Jessica Preece
Quarterly Journal of Political Science, 2016, Vol. 11, No. 2: 219–248.

5. **"Representing the Preferences of Donors, Partisans, and Voters in the U.S. Senate"**
   Public Opinion Quarterly, 2016, 80: 225–249.
4. **"Donation Motivations: Testing Theories of Access and Ideology"**
   Political Research Quarterly, 2016, 69 (1) 148–160.
3. **"Ideological Donors, Contribution Limits, and the Polarization of State Legislatures"**
   Journal of Politics, 2016, 78 (1) 296–310.
2. **"Online Polls and Registration Based Sampling: A New Method for Pre-Election Polling"** with Quin Monson, Kelly Patterson and Chris Mann.
   Political Analysis 2014, 22 (3) 321–335.
1. **"Causes and Consequences of Political Polarization"** In *Negotiating Agreement in Politics*. Jane Mansbridge and Cathie Jo Martin, eds., Washington, DC: American Political Science Association: 19–53. with Nolan McCarty. 2013.

   - Reprinted in *Solutions to Political Polarization in America*, Cambridge University Press. Nate Persily, eds. 2015
   - Reprinted in *Political Negotiation: A Handbook*, Brookings Institution Press. Jane Mansbridge and Cathie Jo Martin, eds. 2015

Available Working Papers

"Race and Realignment in American Politics"
with Jeremy Pope (Revise and Resumbit at *Public Opinion Quarterly*)

"The Policy Preferences of Donors and Voters"

"Estimating Neighborhood Effects on Turnout from Geocoded Voter Registration Records."
with Kosuke Imai

"Super PAC Contributions in Congressional Elections"

Works in Progress

"Collaborative Study of Democracy and Politics"
with Brandice Canes-Wrone, Gregory Huber, and Joshua Clinton

"Preferences for Representational Styles in the American Public"
with Ryan Davis and Adam Dynes

Invited Presentations

"Are Mormons Breaking Up with Republicanism? The Unique Political Behavior of Mormons in the 2016 Presidential Election"

- Ivy League LDS Student Association Conference - Princeton University, November 2018, Princeton, NJ

"Issue Politicization and Access-Oriented Giving: A Theory of PAC Contribution Behavior"

- Vanderbilt University, May 2017, Nashville, TN

"Lost in Issue Space? Measuring Levels of Ideology in the American Public"

- Yale University, April 2016, New Haven, CT

"The Incentives, Ideology, and Influence of Campaign Donors in American Politics"

- University of Oklahoma, April 2016, Norman, OK

"Lost in Issue Space? Measuring Levels of Ideology in the American Public"

- University of Wisconsin - Madison, February 2016, Madison, WI

"Polarization and Campaign Contributors: Motivations, Ideology, and Policy"

- Hewlett Foundation Conference on Lobbying and Campaign Finance, October 2014, Palo Alto, CA

"Ideological Donors, Contribution Limits, and the Polarization of State Legislatures"

- Bipartisan Policy Center Meeting on Party Polarization and Campaign Finance, September 2014, Washington, DC

"Representing the Preferences of Donors, Partisans, and Voters in the U.S. Senate"

- Yale Center for the Study of American Politics Conference, May 2014, New Haven, CT

Conference Presentations

Washington D.C. Political Economy Conference (PECO):

- 2017 discussant

American Political Science Association (APSA) Annual Meeting:

- 2014 participant and discussant, 2015 participant, 2016 participant, 2017 participant, 2018 participant

Midwest Political Science Association (MPSA) Annual Meeting:

- 2015 participant and discussant, 2016 participant and discussant, 2018 participant

Southern Political Science Association (SPSA) Annual Meeting:

- 2015 participant and discussant, 2016 participant and discussant, 2017 participant

Teaching Experience

Poli 301: Data Visualization

- Summer 2022, Fall 2022

Poli 315: Congress and the Legislative Process

- Fall 2014, Winter 2015, Fall 2015, Winter 2016, Summer 2017, Fall 2022

Poli 328: Quantitative Analysis

- Winter 2017, Fall 2017, Fall 2019, Winter 2020, Fall 2020, Winter 2021

Poli 410: Undergraduate Research Seminar in American Politics

- Fall 2014, Winter 2015, Fall 2015, Winter 2016, Summer 2017

Awards and Grants

2019 BYU Mentored Environment Grant (MEG), American Ideology Project, $30,000

2017 BYU Political Science Teacher of the Year Award

2017 BYU Mentored Environment Grant (MEG), Funding American Democracy Project, $20,000

2016 BYU Political Science Department, Political Ideology and President Trump (with Jeremy Pope), $7,500

2016 BYU Office of Research and Creative Activities (ORCA) Student Mentored Grant x 3

- Hayden Galloway, Jennica Peterson, Rebecca Shuel

2015 BYU Office of Research and Creative Activities (ORCA) Student Mentored Grant x 3

- Michael-Sean Covey, Hayden Galloway, Sean Stephenson

2015 BYU Student Experiential Learning Grant, American Founding Comparative Constitutions Project (with Jeremy Pope), $9,000

2015 BYU Social Science College Research Grant, $5,000

2014 BYU Political Science Department, 2014 Washington DC Mayoral Pre-Election Poll (with Quin Monson and Kelly Patterson), $3,000

2014 BYU Social Science College Award, 2014 Washington DC Mayoral Pre-Election Poll (with Quin Monson and Kelly Patterson), $3,000

2014 BYU Center for the Study of Elections and Democracy, 2014 Washington DC Mayoral Pre-Election Poll (with Quin Monson and Kelly Patterson), $2,000

2012 Princeton Center for the Study of Democratic Politics Dissertation Improvement Grant, $5,000

2011 Princeton Mamdouha S. Bobst Center for Peace and Justice Dissertation Research Grant, $5,000

2011 Princeton Political Economy Research Grant, $1,500

Other Scholarly Activities

Expert Witness in Nancy Carola Jacobson, et al., Plaintiffs, vs. Laurel M. Lee, et al., Defendants. Case No. 4:18-cv-00262 MW-CAS (U.S. District Court for the Northern District of Florida)

Expert Witness in Common Cause, et al., Plaintiffs, vs. Lewis, et al., Defendants. Case No. 18-CVS-14001 (Wake County, North Carolina)

Expert Witness in Kelvin Jones, et al., Plaintiffs, v. Ron DeSantis, et al., Defendants, Consolidated Case No. 4:19-cv-300 (U.S. District Court for the Northern District of Florida)

Expert Witness in Community Success Initiative, et al., Plaintiffs, v. Timothy K. Moore, et al., Defendants, Case No. 19-cv-15941 (Wake County, North Carolina)

Expert Witness in Richard Rose et al., Plaintiffs, v. Brad Raffensperger, Defendant, Civil Action No. 1:20-cv-02921-SDG (U.S. District Court for the Northern District of Georgia)

Expert Witness in Georgia Coalition for the People's Agenda, Inc., et. al., Plaintiffs, v. Brad Raffensberger, Defendant. Civil Action No. 1:18-cv-04727-ELR (U.S. District Court for the Northern District of Georgia)

Expert Witness in Alabama, et al., Plaintiffs, v. United States Department of Commerce; Gina Raimondo, et al., Defendants. Case No. CASE No. 3:21-cv-00211-RAH-ECM-KCN (U.S. District Court for the Middle District of Alabama Eastern Division)

Expert Witness in League of Women Voters of Ohio, et al., Relators, v. Ohio Redistricting Commission, et al., Respondents. Case No. 2021-1193 (Supreme Court of Ohio)

Expert Witness in Regina Adams, et al., Relators, v. Governor Mike DeWine, et al., Respondents. Case No. 2021-1428 (Supreme Court of Ohio)

Expert Witness in Rebecca Harper, et al., Plaintiffs, v. Representative Destin Hall, et al., Defendants (Consolidated Case). Case No. 21 CVS 500085 (Wake County, North Carolina)

Expert Witness in Carter, et al., Petitioners, v. Degraffenreid et al., Respondents (Consolidated Case). Case No. 464 M.D. 2021 (Commonwealth Court of Pennsylvania)

Expert Witness in Harkenrider, et al., Petitioners, v. Hochel et al., Respondents. Case No. E2022-0116CV (State of New York Supreme Court: County of Steuben)

Expert Witness in Our City Action Buffalo, Inc., et al., v. Common Council of the City of Buffalo (State of New York Supreme Court: County of Erie)

Expert Witness in Citizens Project, et al., v. City of Colorado Springs, et al. Case No. 22-cv-1365-CNS-MDB (U.S. District Court for the District of Colorado)

Expert Witness in Dr. Dorothy Nairne, et al., Plaintiffs, v. R. Yle Ardoin, Defendant, Case No. 3:22-cv-00178 (U.S. District Court for the Middle District of Louisiana)

Court Appointed Mapping Special Master in Donald Agee, et al., Plaintiffs, v. Jocelyn Benson, in her official capacity as the Secretary of State of Michigan, et al., Defendants., No. 1:22-cv-272 Three-Judge Court (U.S. District Court for the Western District of Michigan)

Additional Training

EITM 2012 at Princeton University - Participant and Graduate Student Coordinator

Computer Skills

Statistical Programs: R, Stata, SPSS, parallel computing

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